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DEPARTMENTAL COMMITTEE ON COMPENSATION FOR
INDUSTRIAL DISEASES.

REPORT

OF THE

DEPARTMENTAL COMMITTEE

ON

COMPENSATION FOR

INDUSTRIAL DISEASES.

REPORT.

Presented to both Houses of Parliament by Command of His Majesty.



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REPORT
DEPARTMENTAL COMMITTEE

COMMISSION FOR

INDUSTRIAL DISEASES

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TERMS OF REFERENCE.

I hereby appoint :—

HERBERT SAMUEL, Esquire, M.P., Parliamentary Under-Secretary of State for the Home Department ;

THOMAS CLIFFORD ALLBUTT, Esquire, M.D., F.R.S., Regius Professor of Physic, Cambridge University ;

HENRY HARDINGE CUNYNGHAME, Esquire, C.B., Assistant Under-Secretary of State, Home Office ; and

THOMAS MORISON LEGGE, Esquire, M.D., Medical Inspector of Factories, Home Office ;

to be a Committee to inquire and report what diseases and injuries, other than injuries by accident, are due to industrial occupations, are distinguishable as such, and can properly be added to the diseases enumerated in the Third Schedule of the Workmen's Compensation Bill, 1906.

And I further appoint HERBERT SAMUEL, Esquire, M.P., to be Chairman, and F. L. D. ELLIOTT, Esquire, of the Home Office, to be Secretary of the said Committee.

(Signed)

H. J. GLADSTONE.

Whitehall,

4th August, 1906.

The Third Schedule of the Workmen's Compensation Act 1906 is as follows :—

| Description of Disease. | Description of Process. |
|---------------------------------------|---|
| Anthrax - - - - - | Handling of wool, hair, bristles, hides, and skins. |
| Lead poisoning or its sequelæ - - - | Any process involving the use of lead or its preparations or compounds. |
| Mercury poisoning or its sequelæ - - | Any process involving the use of mercury or its preparations or compounds. |
| Phosphorus poisoning or its sequelæ - | Any process involving the use of phosphorus or its preparations or compounds. |
| Arsenic poisoning or its sequelæ - - | Any process involving the use of arsenic or its preparations or compounds. |
| Ankylostomiasis - - - - - | Mining. |

Where regulations or special rules made under any Act of Parliament for the protection of persons employed in any industry against the risk of contracting lead poisoning require some or all of the persons employed in certain processes specified in the regulations or special rules to be periodically examined by a certifying or other surgeon, then, in the application of this Schedule to that industry, the expression "process" shall, unless the Secretary of State otherwise directs, include only the processes so specified.

DEPARTMENTAL COMMITTEE ON INDUSTRIAL DISEASES.

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R E P O R T.

TO THE RT. HON. HERBERT J. GLADSTONE, M.P., Secretary of State for the
Home Department.

SIR,

The Committee has held forty-one sittings, of which some have been at Bradford, Huddersfield, Sheffield, Birmingham, Wolverhampton, Glasgow, Manchester and Swansea, the remainder in London.

We have heard the evidence of a hundred and fifty-nine witnesses, ninety-two of whom belonged to the medical profession, the others being almost all either employers or workmen. We have visited many factories and works of various kinds in order to view the processes we were investigating, and the medical members of the Committee have made clinical examinations of a number of the workpeople engaged in them. We have had the advantage of consulting the evidence and the Reports, in so far as they related to the subject matter of our Inquiry, of Committees appointed by your predecessors on Dangerous Trades, on the Conditions of Labour in Chemical Works, on the Dangers to the Life and Health of Workers in Quarries, on Water Gas and other Gases Containing a Large Proportion of Carbonic Oxide, and on the Health of Cornish Miners. We have found much valuable information also in the Annual Reports of the Chief Inspector of Factories, in Dr. Oliver's encyclopaedic book on "Dangerous Trades," and in a number of technical publications by medical men. As the outcome of these investigations we have the honour to present the following Report.

PRINCIPLES OF SELECTION.

To each of the diseases or forms of injury which have been under our consideration we have applied three tests in compliance with the provisions and intention of the Workmen's Compensation Act.

(i.) Is it outside the category of accidents and diseases already covered by the Act?

(ii.) Does it incapacitate from work for a period of more than one week, which is the minimum period for which compensation is payable under the Act?

(iii.) Is it so specific to the employment that the causation of the disease or injury by the employment can be established in individual cases?

(i.) The question of the proper line of demarcation between "accidents," which are already included in the Act, and "diseases" which might properly be added to its schedule, has arisen several times in the course of our Inquiry. We have had to consider, for example, many forms of poisoning by gaseous fumes. They cannot all be left in the category of accidents. In some cases, in which compensation should clearly be payable, the symptoms occur through the exposure of the workman to the noxious fumes during a considerable period; and though this exposure may sometimes be due to some definite mistake in the process of manufacture, in other cases no exceptional cause can be assigned with certainty. The Courts could not hold in such circumstances that the man's illness was due to an "accident," and it would be necessary to schedule it as an industrial "disease." On the other hand they cannot all be placed in the category of diseases. Cases in which men are suddenly asphyxiated by some poisonous gas, evolved in a mine explosion, for example, or released by the bursting of a vessel—to class these, even if the consequences be deferred or protracted, as "diseases" and not as "accidents" would be to do violence to the ordinary use of language. The same difficulty presents itself with

respect to many kinds of muscular strains and internal lesions. It is necessary to find some dividing line.

The question is complicated by the fact that the Courts have held that anthrax, which is ordinarily regarded as a disease, may be the consequence of an accident within the meaning of the Workmen's Compensation Act;* while Parliament, wishing perhaps to include beyond doubt all cases of anthrax, has since named it in the schedule of diseases.

In the dicta of the Law Lords while giving judgment in cases where this point was raised, we find in all definitions of the term "accident" some such phrase as "unlooked-for mishap," "unintended occurrence," or "untoward event." Compelled, as we have been, to fix a boundary, we have necessarily been led by these expressions of authority to regard as the results of "accident" those symptoms which are due to a "mishap," an "occurrence," or an "event"—that is to say, to a cause which operates at a definite moment of time—and to regard as "diseases" or as "injuries not being injuries by accident" those which cannot be attributed to a cause of that character.

(ii.) The second condition—that the disease or injury should be such as to incapacitate from work for a period of at least a week—is adopted for obvious reasons and presents little difficulty. It excludes a very few ailments, some of them transitory in their effects, such as "brassfounders' ague," some, like the deafness prevalent among boilermakers, of a chronic nature, but not such as to prevent the workmen from continuing at their trade.

(iii.) The third condition requires the disease or injury to be specific to the employment. Many diseases may be regarded as trade diseases, and rightly so regarded, because they are known to be specially prevalent among the workers in particular industries; but they may not be specific to the trade, since they may frequently, although more seldom, attack persons engaged in other occupations. Bronchitis, for example, is a trade disease among flax-workers; a larger proportion of that class suffer from it than of other people; but it is not specific to the employment, for numbers of persons who are not flax-workers contract it also. Unless there is some symptom which differentiates the bronchitis due to dust from the ordinary type, it is clearly impracticable to include it as a subject of compensation; for no one can tell, in any individual case, whether the flax-worker with bronchitis was one of the hundreds of persons in the town whose bronchitis had no connection with dust irritation, or whether he was one of the additional tens or scores of persons whose illness was due to that cause. To ask a court of law to decide would be to lay upon it an impossible task. If the workman were required to prove his case, he might be able to show that a larger percentage of his trade suffered from bronchitis than of the rest of the population, but he could never show that he himself was a unit in the excess, and not in the normal part, of that percentage. If it were the employer who was required to disprove a claim, he could rarely, if ever, show that the workman did not contract the illness through his employment, and he would be compelled to compensate not only those labourers whose bronchitis had a trade origin, but also all those whose bronchitis was in no degree an industrial disease. We gather from the debates in Parliament that it was a recognition of this necessity of some means of deciding in individual cases whether or not the disease was due to the employment, which decided the Legislature not to open the door to claims from workmen suffering from *any* disease, as the door is open to claims on the score of *any* accident, but to proceed by way of scheduling those diseases which can, in any given case, be differentiated as due to the special conditions of a trade.

* *Brintons Limited v. Turvey* (1905 Appeal Cases 230). . . . "the County Court Judge awarded compensation to the respondent, saying: 'I find as a fact that the anthrax, which was the immediate cause of death, was caused by the accidental alighting of a bacillus from the infected wool on a part of the deceased's person which afforded a harbour in which it could multiply and grow and so cause a malignant disease and consequent death. I can see no distinction in principle between the accidental entry of a spark from an anvil or the accidental squirting of scalding water or some poisonous liquid into the eye. The only difference is that in those cases the foreign substance would be so large as to be visible, in this case the foreign substance is microscopic. . . . My judgment is based on the fact that there was in this case a fortuitous intrusion of a foreign substance into the eye which by its presence there caused death.'"

This decision was affirmed by the Court of Appeal (Collins, M.R., Mathew and Cozens-Hardy L.J.J.) and by the House of Lords.

This argument is subject to the qualification that where a disease is common in a particular trade, and the same disease exists, but very rarely, outside the trade, it may be right to make it the subject of compensation, even though the employers may be called upon to relieve the small percentage of cases which would occur among the men employed in the industry while due to causes unconnected with the industry.

In this connection, we have had to consider also whether we should investigate, with a view to inclusion in the Schedule, cases of persons who, in the course of their employment, contract by contagion or infection some widely prevalent disease. The claim for compensation may sometimes appear to be a strong one, as in the case of a labourer sent to assist in disinfecting a ship which has had cases of small-pox on board and who himself catches the disease. And here, although the illness is not specific to the employment, sufficient proof that it was contracted in the course of the employment may sometimes be possible. But to admit this class of claim would involve admitting also the claim of the nurse or the doctor's assistant who attends an infectious case and takes the infection, the schoolmaster who contracts measles from the pupils in his school, the shop assistant who catches influenza from another assistant in the same shop, the domestic servant who takes an illness which chances to be in the house—a variety of cases which we have no reason to think Parliament intended to be considered as industrial diseases. We are of opinion that neither the wording of the Act, nor the character of the Third Schedule in its present form, nor the discussion of the Bill in Parliament, gives any indication that our legislation on Workmen's Compensation contemplates cases of ordinary illnesses contracted by chance through exposure to infection while in an employer's service.

The Act permits the burden of proof, in the question whether a disease was or was not due to the employment, to be laid in any class of cases either on the workman who makes a claim or on the employer who resists it. Section 8 (1) provides that compensation shall be paid to a workman who is found to be suffering from a disease mentioned in the first column of the Third Schedule to the Act. Section 8 (2) provides that if the workman was employed in any process mentioned in the second column of the Third Schedule opposite to that disease, then, in ordinary course, the disease shall be deemed to be due to the nature of the employment unless the employer proves the contrary. In a case, for example, of anthrax, the workman, if he is employed in the handling of wool, hair, bristles, hides or skins (the processes mentioned in the second column of the schedule), is entitled to his compensation, unless the employer can show that the disease was not due to the trade; but if the workman is employed as a farm labourer he is still able to claim compensation, although his occupation is not mentioned in the Schedule, only the onus would rest upon him of showing that his disease had been caused by the employment. In each of the cases we have investigated we have therefore found it necessary to consider on which party it is just to lay the burden of proof—in other words, what processes, if any, should be added to the second column of the Schedule in connection with diseases to be added to the first.

Section 8 (6) empowers the Secretary of State, when making additions to the Third Schedule, to modify the Industrial Diseases Clause itself in its application to the added diseases. We have borne this fact in mind, but we have not found it necessary to propose any such modification.

I.—FORMS OF POISONING.

1. *Nitro- and amido-derivatives of Benzene.*—Dinitrobenzol and dinitrotoluol—nitro-derivatives of benzene—are recognised as capable of producing marked symptoms of ill health among the comparatively small number of men engaged in their manufacture, or in their use in the preparation of certain high explosives. These symptoms may incapacitate for some weeks or months. Poisonous effects result from inhalation of fumes or dust, and, unlike most other chemicals, from direct absorption through the skin in handling the material itself or solutions containing it. The symptoms are due to degeneration and destruction of the red corpuscles in the blood, and to direct action, in severe cases, on the nerve centres. Anæmia and cyanosis (lividity), most easily seen in the lips, are always prominent

and distinctive. In severe cases the sensory and motor nerve endings may become affected, and muscular atrophy, mostly of the fingers and thumb, results. Habits of life and previous work affect susceptibility to the poison.

Inhalation of the vapour of anilin oil—an amido-derivative of benzene—or of the vapour of anilin hydrochloride, or absorption of the oil through the skin, may cause symptoms of the same nature and due to the same cause as those just described, although as a rule they are much less pronounced. The effects of anilin oil, as used industrially in anilin black dyeing, are shown by the appearance in some workers of greyish or bluish coloration of the lips, accompanied by varying degrees of headache, dizziness, drowsiness and lassitude, some difficulty in breathing, and gastric disturbance with loss of appetite. These symptoms, as is the case also in dinitrobenzol workers, are aggravated in hot weather. We do not doubt that definite effects, the result of inhalation of anilin vapour, may incapacitate the worker for a longer period than a week, but we would guard against the assumption that all illness in anilin black dyers is to be attributed to anilin.

In factories in which nitro- and amido-derivatives of benzene are made or used persons are found showing in slight degree the signs of their calling. With a view to obtain, if possible, proofs more conclusive than previous investigations had furnished of the precise changes in the blood which would serve as a means of diagnosing anilin and dinitrobenzol poisoning in distinction from illness due to some other cause, we invited Dr. W. Malden, of the Pathological Laboratory, Cambridge, to make special inquiry on this point. His report, based on exhaustive researches, will be found in the Appendix, and not only places beyond doubt the toxic effects of the substances, but furnishes data on which, in doubtful cases, a sound judgment can be based.

Poisoning by dinitrobenzol and anilin is distinctly a trade disease; and we consider that those who are employed in their manufacture or in their use should be entitled to compensation when incapacitated by their effects. These forms of poisoning can be most conveniently scheduled under the general heading of "Poisoning by nitro- and amido-derivatives of Benzene," a form which would also cover cases of disease from the use of other members of this dangerous chemical group, should such cases occur.

2. *Carbon-bisulphide*, used in india-rubber manufacture, has been, in earlier years, the cause of a number of grave cases of disease.

The chronic effects were due either (*a*) to the action of the vapour, when inhaled, on the nerve centres, causing mental exaltation or depression, or (*b*) to inflammation of the sensory and motor nerve endings, producing numbness of the feet and hands, followed in some cases by peripheral neuritis or temporary blindness. In less severe cases headache, dizziness, gastric disturbance, and impairment of appetite were frequent.

The dangerous properties of carbon-bisulphide have long been recognised, and stringent Special Rules were made by the Home Secretary in 1897 to protect the workers exposed to its effects. These rules have proved successful, and our inquiries lead to the conclusion that in recent years the disease has been wholly eradicated. So long as the substance is used, however, the possibility of poisoning remains. Should cases recur we consider that they should be the subject of compensation.

3. *Naphtha*.—Cases are reported in which persons engaged in the cleaning out of naphtha storage tanks have been overcome and rendered unconscious from the fumes. Such cases are in the nature of accidents, but naphtha has also been alleged to be a cause of illness, gradually contracted, among workers in india-rubber factories. We have carefully investigated this question, have visited factories where naphtha is used, have examined and questioned the workers, and have asked the opinion of a number of witnesses qualified to speak with authority. The smell of naphtha vapour causes in some workers headache, nausea and vomiting, and if there is vaporisation from large surfaces spread over with the material in rooms with deficient ventilation, psychical disturbance may result, akin to that produced by alcoholic vapour. We have not been able to find evidence that workers are incapacitated for a period as long as a week, and are of opinion that naphtha poisoning should not be added to the list.

4. *Carbonic Oxide*.—We received much evidence to the effect that poison-

ing by this gas is invariably sudden, and therefore in the nature of an accident, and that after effects can be referred back to a definite time when inhalation occurred. But four instances were given by Dr. Judson Bury and Dr. Oliver of gradual poisoning, without occurrence at any time of unconsciousness, by furnace gas, in which about 25 per cent. of carbonic oxide is present. Multiple neuritis was the main symptom in all four cases, and there appears to be little doubt that some constituent of the furnace gas was the direct cause.

The subject, however, is by no means free from obscurity. Had a gas, which is so common as carbonic oxide, possessed noxious qualities of this character, we should have expected that the fact would have been recognised long since and in many more than four cases. The evidence that has been so far collected we cannot consider sufficient to establish that poisoning either by carbonic oxide or by other gases evolved in furnaces can be regarded as a trade disease.

5. *Nitrous Fumes*.—Cases of poisoning from this source (some fatal) were described by witnesses as occurring at times in chemical and explosives factories. A characteristic of this form of poisoning is the insidious onset of the symptoms—a man may go on working after inhalation of the fumes with little inconvenience, and yet succumb twenty-four or thirty-six hours later from acute congestion of the lungs. The fumes set up a severe inflammation, which takes some hours to bring about the exudation into the smaller bronchial tubes and air vesicles, which eventually completely fills them. It was the opinion of the witnesses that such poisoning was in the nature of an accident. Cases might arise, however, where proof of this was difficult, and, since compensation should be payable in such cases, we think it advisable to recommend the inclusion of “Poisoning by nitrous fumes” in the Schedule.

6. *Arseniuretted Hydrogen*.—More than one medical witness, notably Professor Glaister, considered that special attention should be called to this form of poisoning, in view of the insidious action of the gas and the unlooked-for places in which its existence had been proved. Medical men are not, as a rule, familiar with the symptoms, which, once seen, can never be mistaken for any other form of illness. In the course of a few hours after inhalation of even minute quantities of the gas there is shivering followed by weakness, headache, vomiting, and collapse. After 8 to 10 hours and later the destructive action of the gas on the red blood cells shows itself by the presence of blood in the urine. In 24 hours jaundice appears, and usually becomes of an intense coppery hue. Death may occur within 24 hours, but in the majority of cases is delayed until the lapse of a week or more. Recovery in the mild cases is slow. Almost all the cases of poisoning by arseniuretted hydrogen gas have been due to work carried on in confined spaces, or under conditions in which removal of the gases evolved was impeded.

It is unnecessary to add this form of poisoning to the list, as it is already included under the heading of “Arsenic Poisoning or its Sequelæ.” As the symptoms described, however, differ so markedly from the cutaneous and gastric symptoms of arsenic poisoning, as ordinarily understood, we are glad to have the opportunity of calling attention to the point.

7. *Sulphuretted Hydrogen*.—Sulphuretted hydrogen gas, evolved in various processes in gas works and chemical works, has not unfrequently produced grave and even fatal illness; but its generally recognised effect is extreme suddenness of onset. The “gassing” takes place at a particular moment. We had evidence from the Chief Inspector under the Alkali Act, however, of special susceptibility of some persons to the effects of sulphuretted hydrogen gas, so much so as to necessitate their seeking some other employment. We are of opinion that such cases are exceedingly rare. Nor can personal idiosyncrasy of this kind be said to be equivalent to incapacity due to the nature of the employment. We consider that no sufficient argument has been adduced to enable us to regard the effect of the gas, for the purposes of the Workmen’s Compensation Act, as other than due to accident.

8. *Sodium Cyanide and other Cyanogen Compounds*.—Hydrocyanic acid gas similarly, generated in the manufacture of cyanide compounds, has caused fatal illness; but its effect is sudden also, and we have not received evidence that workmen suffer gradual poisoning as the result of exposure over a period of time. We communicated with the factory surgeon at a sodium cyanide plant in existence

for some years, but no case of gradual poisoning among the workmen employed upon it had come under his notice, although any such case would have become known to him directly or indirectly. Cases of illness from these compounds are therefore "accidents" within the meaning of the Workmen's Compensation Act, and it is neither necessary nor possible to include this form of poisoning in the Schedule.

9. *Nickel Carbonyl*.—The plant, for the separation of nickel from the ore, of which there is only one in England, is now so carefully watched and safe-guarded that no cases of poisoning have occurred recently. At the first introduction of the process five years ago, however, before the dangerous properties of this gas had been recognised, a number of men were poisoned, some of them fatally. The remarkable train of symptoms—unlike those produced by any other known compound—described by Dr. J. Jones, who has seen the twenty-five cases which have occurred, will be found in the Minutes of Evidence. The slight initial symptoms of headache, giddiness, anæmia and pain in the post-sternal region, are followed twelve to eighteen hours later by severe pain down the front of the chest, and whenever movement is made there is difficulty in breathing. The respirations gradually become more and more rapid until the fifth or sixth day, when they begin to become less frequent and signs of recovery set in. Three of the cases, however, proved fatal; the others all ended in complete recovery. There can be no guarantee that cases will not recur and we recommend that the disease be added to the Schedule.

10. *Potassium Chlorate*.—It has been suggested that the dust evolved in the grinding of potassium chlorate, if inhaled, might be a cause of chronic anæmia. We have not received, however, any evidence that this result actually occurs.

11. *Handling Lead and Arsenic Compounds*.—We have received evidence to the effect that lead and arsenic poisoning may be contracted by dock labourers engaged in the unloading of cargoes of lead or arsenic compounds. The Schedule of the Act as it stands allows any workman to claim compensation for lead poisoning, but if he is employed in "any process involving the use of lead or its preparations or compounds" the workman is relieved from the onus of proving that the disease was due to his employment. Arsenic poisoning stands on the same footing. The dock labourer, however, who unloads from a ship ore containing one of these substances cannot be said to "use" the ore, any more than a furniture remover who unloads furniture from a van can be said to "use" it. We are of opinion that a man who contracts lead or arsenic poisoning in this way should be placed in as favourable a position in claiming compensation as men who contract it in the processes already covered by the Act, and we recommend that an addition be made to the Schedule accordingly.

12. "*Brass-founders' Ague*."—The fumes evolved in the pouring of brass give rise to a peculiar train of symptoms known as "brass-founders' ague," which are believed to be due rather to the zinc than the copper element in the alloy. The malady is observed especially on resumption of work after a few days' absence, and in workshops where egress of fumes is impeded. The Committee entertains no doubt as to the extensive prevalence of the affection, which is characterised by comparatively sudden onset of malaise, trembling, sense of depression, shivering and chattering of teeth, and feeling of cold followed on the evening of the same day by vomiting and speedy recovery. Nor can the evidence be doubted that illness among brass casters is considerably greater than among members of other branches of the trade, and for this reason they are permitted to come on the superannuation funds of their Trade Society at 55 years of age as compared with 60 for other members. This excessive illness, however, among brass casters late in life, although associated with fumes, cannot be ascribed either to "brass-founders' ague" or to any specific disease of the calling, but is mainly bronchitic in nature, and is therefore dealt with elsewhere in the Report.

The evidence we have received shows that "brass-founders' ague" is very transitory in its effects; they seldom last for more than a day, and we cannot find that they ever continue for so long as a week. No claim for compensation, therefore, can arise under this head.

13. *Brass Poisoning*.—From one witness the Committee heard evidence of brass poisoning, which was viewed as the aspect which "brass-founder's ague" assumes

among polishers, filers and other brass workers not exposed to the fumes. Symptoms of anæmia, excessive debility, emaciation, nervousness and neuralgic pains, accompanied in all cases by a green line at the bases of the teeth, were attributed to this cause. This green deposit of basic carbonate of copper, it may be remarked, is, unlike the blue line of lead poisoning, not found upon the gums, but on the teeth, close to the gums, and points only to work involving exposure to brass dust. Even in the severer forms of such illness, under proper treatment, recovery was said to take place in a few weeks. No distinct sequence of symptoms obtains, and brass poisoning, as described, has not received general medical recognition. To schedule brass poisoning would lead to claims made in all good faith for any ill-defined sickness in persons showing a green line on the teeth, and we are clearly of opinion that it should not be included.

14. *African Boxwood*.—Use of this wood—in shuttlemaking—dates only some ten years back. The difficulties in its identification were considerable, for this is one of the fresh woods, which, under fancy names, come upon the market from time to time, their botanical source and properties being almost unknown. Generally throughout the trade it is known as West African boxwood or Knysna boxwood—Knysna being the port in South Africa from which it is exported. But these are two distinct woods, which, resembling each other closely in appearance, belong to different orders. Neither of them is a boxwood, but since shuttles are largely made of Persian boxwood the suggestive appellation has been given to both the African woods.

Recurring attacks of headache, coryza, lachrymation, and asthma-like seizures when working the particular wood, led the workmen themselves to submit samples of it to Professor Harvey Gibson, of the Hartley Botanical Laboratories, Liverpool. Subsequently, in consequence of the attention called to the matter, the manufacturers submitted samples of the same Knysna boxwood for examination by Professor Dixon of the Pharmacological Laboratory, Cambridge. Both experimenters prepared an alkaloid identical in its chemical and physiological properties. Although as a result of differing method of experiment they were led to view the action of the drug in a different light—the one as a cardiac depressant the other as a paralysing of the motor nerve endings similar to the arrow poison curare—they were both at one as to its extremely poisonous character.

Shuttlemaking is a small industry, and it is not in all factories that the wood is used so continuously as to produce the accumulative effect which the evidence shows to be necessary before any marked symptoms of respiratory or other trouble appear. This may account for the fact that, so far as we can learn, the number who have been incapacitated from work in Blackburn (one of the chief centres of shuttlemaking) has been but few. Medical experience of the effects produced is scanty, but with a history of employment in shuttlemaking asthma-like seizures, brought on when working African boxwood, should guide the practitioner in attendance to the true nature of the case.

The existence of poisoning by African boxwood has been proved to our satisfaction and we recommend its inclusion in the Schedule.

II.—DISEASES OF THE SKIN, ETC.

15. *Chrome Ulceration*.—The skin of workers engaged in the manufacture of potassium and sodium bichromate, or in the use to which chromic acid or solutions of the alkaline bichromates are put in dyeing, colour making, photo-engraving, and other processes, may become the seat of eczematous eruptions or of ulceration, which commences frequently, but not always, when there has been an abrasion. The lesions thus caused are somewhat intractable and may cause incapacity for several weeks. A cut or abrasion of the skin, if unprotected and neglected, among workers engaged in the manufacture of the crystals or in their use in strong solution, becomes the seat of a sluggish ulcer with characteristically undermined and thickened edges, known as a “chrome hole,” and in this class of work eruptions are rare. Where on the other hand the material is in dilute solution, as in slub dyeing and anilin black dyeing, the form assumed is usually a papular eruption, especially at such points on the hands and fingers and under surface of the wrist and forearm where contact with the material has been more persistent. Constant immersion of the hands in the solution may cause the papule to burst, leaving a chronic ulcerated condition. The

skin of some workers is much more readily attacked than that of others. The ulceration may penetrate to the bone and lead to loss of the nails, or deformity of the joints of the finger. Where in the manufacture of the crystals dust is inhaled, the septum of the nose generally becomes perforated, but during the months that this process of ulceration takes before it is completed there is no evidence that the pain or inconvenience is ever such as to cause incapacity for a week.

The lesions can be distinguished without difficulty. The affection directly arises from the employment, and we recommend that it should be added to the Schedule.

16. *Other forms of Ulceration and Erosion of the Skin.*—In a variety of trades the skin of the workers suffers from the deleterious nature of dusts that are produced, or corrosive or caustic liquids that are used. We have had evidence to this effect relating to tile-makers and colour-blowers in the potteries, to cabinet-makers working certain kinds of satin-wood, to dyers and bleachers, and to some other trades.

The disease is usually of an eczematous nature, by which we mean that it resembles in appearance the idiopathic, common, superficial dermatitis, known as eczema, but it differs from this in that in all cases it is the reaction of the healthy skin to a definite known irritant, and is characterised by those parts of the body only being affected, as a rule, which are uncovered, notably the hands and forearm. Less frequently the disease may assume the form of localised ulceration of the skin of the hands or forearm, such as has been described under "Chrome ulceration." Inhalation of the lime dust from the unloading of such cargoes as calcined spathic ore may give rise not only to a slight eczematous eruption of the skin, but also to the development of several small ulcers on the mucous membrane lining the buccal cavity, and this lesion should also come within the definition to be adopted. We consider that compensation should be payable in these cases, and that they should be included in the Schedule under the comprehensive heading of "Eczematous ulceration of the skin produced by dust or caustic or corrosive liquids, or ulceration of the mucous membrane of the nose or mouth produced by dust."

In this connection we would recommend, however, a departure from the procedure usually followed. It is not possible to say in all the cases, or even in a very large proportion of the cases, in which the existence of the disease is established, that it must necessarily have arisen from the employment. A disease having been recognised as anthrax, or lead poisoning, or chrome ulceration, and the worker having been employed in handling hides, or making pottery with lead-glazes, or dyeing with chrome, the probability that the disease is due to the employment is so overwhelming that it is just to secure compensation to the worker unless the employer can show that it is not so due. But in these injuries to the skin there is a less approach to certainty. The same symptoms might be caused by a corrosive liquid used in the home, or even, in rare cases, be the result of idiopathic disease. We are of opinion, therefore, that the burden of proof should in this case be left, as it is always left in cases of accident, on the workman, and that no processes should be inserted in the second column of the Schedule opposite to this disease. We foresee little difficulty in furnishing the necessary proofs in cases in which the disease clearly arises from the trade.

17. *Chrysoidine Poisoning.*—Chrysoidine is a substance used in the boot trade for colouring the soles of boots and shoes. Five or six years ago a number of cases of severe ulceration of the hands and arms occurred among boot-makers in Bristol and was attributed to its use. Other cases have been recorded elsewhere. We have inquired fully into the circumstances and feel convinced that cases of skin poisoning have occurred among boot-makers using this substance, but we are inclined to think that the injuries may have been due not to the chrysoidine itself, but to one or several of the acids with which it is sometimes mixed. Chrysoidine has been in long and general use in the boot trade, and had it possessed dangerous properties the cases of poisoning would have been numerous and the danger recognised long since. But it is unnecessary for us to arrive at a definite conclusion on this point, for, whatever be the chemical agent which has caused the injury, compensation should be payable; and, whatever it be, the case will be covered by the heading last proposed for inclusion in the Schedule. In this case, also, the causation of the disease by a trade process is not in any given instance so certain that it would be just to relieve the workman from the onus of proof. It is unnecessary, therefore, to schedule this disease separately on that account.

18. *Pitch Ulceration.*—We find that men engaged in the handling of pitch or

other tarry products, either in unloading pitch from vessels or railway trucks, or in the manufacture of briquettes, or in handling "coal oil" in the manufacture of grease, are liable to suffer from warty growths, which ulcerate and occasionally become the seat of epitheliomatous cancer. The growths may occur on any part of the body, and are common on the face, hands, and scrotum. They commence as small nodules in the skin and almost immediately begin to break down, forming an ulcer covered by a crust, which gives the characteristic appearance to the so-called wart. The underlying ulcer almost invariably heals up, leaving a small scar when the crust has fallen off. We believe this to be the normal course, although witnesses regarded the scar as the result of the primitive methods of treatment adopted by the workers. The growth when in situations exposing to friction, without taking on a malignant character, may become inflamed, and require removal by operation. When they take on an epitheliomatous character the situation is almost invariably on the scrotum. The disease then follows the usual course, involving neighbouring organs and tissues and can only be arrested by free excision. Epithelioma is the least malignant form of cancer, and on removal is not usually followed by a recurrence. We saw men, still at their ordinary work and in good health, on whom such operations had been performed several years previously. The amount of incapacity caused by the condition, whether in its benign or malignant manifestation, need not be great. There was general consensus of opinion that the cancerous condition could be prevented by scrupulous cleanliness, but we satisfied ourselves that occasionally it may develop in those who have paid all reasonable attention in this respect.

Particles of pitch striking the eye are prone to set up very severe inflammation of the conjunctival mucous membrane and cornea. It was stated that where injury occurs to the eyes by pitch "they generally do very badly." A breach of surface caused by the chemical action of the pitch particle gives entrance to bacteria which induce a septic inflammation involving the cornea and other structures of the eye, so that the danger of loss of sight is considerable. The Committee saw a case of blindness which had resulted in this way.

We have no doubt that the lesions are specific to the trades mentioned, and that they should be made the subject of compensation.

19. *Chimney-sweeps' Cancer*.—The mortality from cancer among chimney-sweeps is twice what it is among occupied males generally. The tables supplied to us by Dr. Tatham, the Superintendent of Statistics, General Register Office, show that for the three years, 1900-1-2, the comparative mortality figure for cancer among chimney-sweeps at ages 26-65 was 133 as compared with 63 among occupied males at the same ages. This excessive prevalence is certainly due to the nature of the trade, the soot setting up an irritation of the skin similar to that produced by pitch or tar and with similar results. "Chimney-sweeps' cancer" has been, indeed, a term long in use among medical men; but the disease as it is described in text-books is epitheliomatous cancer of the scrotum or scrotal region, and epithelioma occurring in other parts of the skin, as the lip, is in them very rare. Chimney-sweeps suffer from malignant disease in other parts of the body in common with the rest of the population, and persons who are not chimney-sweeps have been known very occasionally to suffer from cancer of the scrotum. But cancer in the scrotal region is the cause of the excessive mortality among chimney-sweeps from cancer, and it is so characteristic as sufficiently to distinguish it from cancer of all other kinds. This form of cancer is frequently preceded by a warty ulcerous growth; but warts such as have been described as common on the face, neck, and arms of pitch workers, are much less frequently found in chimney-sweeps. It is desirable, therefore, to schedule the disease separately as "Scrotal epithelioma."

20. *Mange*.—One witness, the General Secretary of the London Carmen's Trade Union, suggested that this disease, occasionally contracted by men brought into contact with horses, should be made the subject of compensation. We have been unable to obtain medical evidence, either through that witness or from other sources, that the disease incapacitates for a period of a week or more. We do not recommend its inclusion.

III.—DISEASES OF THE EYE.

21. *Nystagmus*.—This disease is prevalent among miners in certain districts, especially where the coal seams are thin. It is due primarily to fatigue of the

elevator muscles of the eyes from the constrained position, in an oblique upward direction, in which the eyes have to be kept. Insufficiency of light from the lamp would appear to be a secondary but not inconsiderable cause. The miner mainly affected is the hewer who works at the coal face, but deputies in low seams, the on-setter in charge of the cage, and others also, may, and do, suffer. The objective symptom is an oscillation of the eyes (nystagmus), the rate varying from 100 to 300 times per minute, and associated with it subjectively are headache, giddiness, and dancing of objects before the eyes, which cause frequently much discomfort and occasionally incapacitate the miner entirely from work. The malady, as a rule, does not occur under 30 years of age, and rarely until after 10 years from commencement of work. Recovery may be expected on cessation from pit work in from 3 to 12 months' time, but long before this—in a few weeks, in the majority of cases—work not involving the particular eye strain is possible. Cases of nystagmus, as regards degree of incapacity, were classed for us by Dr. Meighan, Surgeon to the Glasgow Eye Infirmary, in three groups: (1) those in which the patients are slightly affected and do not cease work; (2) those in which the oscillation is accompanied by giddiness, and where the men have to leave off their particular work underground; and (3) those where the men are obliged to cease work altogether. He considered that 5 per cent. of men employed in mines would represent the number who sought treatment under one or other of the three classes, but that the first class would embrace most of the cases. The weight of evidence, however, was strongly in favour of the view, that no matter what stage nystagmus might have reached when medical advice for symptoms due to it was sought, pit work should be entirely relinquished on the ground that this course alone would prevent aggravation. This view was expressed notwithstanding the fact that miners, who had undergone treatment for nystagmus five or six years previously and been cured, were known to have resumed their ordinary work again and continued in it without, so far as the witnesses knew, further injury. The data on which this medical practice is based do not appear to us, from the evidence, to be entirely conclusive, and in some cases, perhaps, the advice appears to have been given as the result of dogmatic statements made on the subject rather than of actual experience. The importance and far-reaching character of this medical conclusion will at once be apparent, when it is remembered that the most prominent point brought out by the evidence in regard to the disease was that, although its existence can be easily diagnosed, the symptoms are largely subjective, and there is no necessary relation between the severity of the disease and the degree of incapacity. In other words, one man may exhibit a very marked oscillation of the eyes, and yet suffer little discomfort, and be able and willing to continue at his work; another may show overt symptoms less acute, and yet may claim, and claim truly, that he is incapacitated from his usual employment. This fact may perhaps give rise to difficulty in settling disputed cases of compensation. But since the only prospect of curing nystagmus is for the sufferer to abandon, if not altogether, at least for a time, employment below ground in badly lighted mines, it is clear that nystagmus may furnish a legitimate ground for compensation, even if the overt symptoms are comparatively slight. For the patient, though he may not at the time be actually unable to continue his work, ought to discontinue it if he is not to get worse; and if the result is that, under medical advice, he has to accept employment above ground at a lower wage, he is, in the words of the Act, "disabled . . . from earning full wages at the work at which he was employed."

We recommend that miners' nystagmus be added to the Schedule.

22. *Bottlemakers' Cataract*.—Evidence relating to this ailment was given by Mr. W. Robinson, Hon. Surgeon to the County of Durham and Sunderland Eye Infirmary, who showed that among 374 men engaged in the bottle making industry in the district, of whom 122 were bottle finishers, eighteen were admitted to the Infirmary on account of cataract in 1902, six in 1903, two in 1904, and one in 1905. No case was admitted in 1906. The abnormal number in 1902 was, however, due to admission of cases in order that the development of this disease, about which very little was definitely known, might be watched. In his important evidence, Mr. Robinson was emphatic that the disease was practically confined to bottle finishers, among whom it commences at a comparatively early age, and that in nearly all cases it began as a posterior cortical cataract, a form otherwise rarely seen. The malady he attributes to the great heat and light encountered when looking into the furnace, and its origin at the posterior pole to the

situation here of the nodal point, where the rays falling on the lens cross and pass without refraction. These two crucial points—precise form assumed, and distinctive age of development—were not supported by such further evidence as we heard from ophthalmic surgeons, although it is only proper to add that their experience of cataract among bottlemakers was very limited.

Mr. A. Greenwood, Secretary to the Glass Bottlemakers' of Yorkshire United Trade Protection Society, furnished us with tables, most carefully compiled, which are printed in the evidence. They bring out the striking fact that (omitting traumatic cataract as being an accident) among 114 members superannuated between December 1897 and December 1906, 34 men (30 per cent.) had suffered or were suffering from cataract, and three others from opacity of the lens. The total membership of the Society was somewhat over 2,000.

The Secretary of the Lancashire District of the Glass Bottle Makers' Association has written to us to the effect that of the 1,000 members of his Society, 36 are on the superannuation fund, and six of these on account of cataract. The Secretary of the Pressed Glassmakers' Society, Gateshead, informs us that among 510 members, 33 have been superannuated, four of these from the same cause. These latter figures were sent to us when our inquiry was almost completed.

The employers who appeared before us, on the other hand, attached small importance to the ailment, and some were ignorant of its existence as a disease belonging to the trade. This is no matter for surprise, for the cases are small in number in proportion to the men employed, and exceedingly small in individual factories.

We deemed it would be useful to make the closest inquiry into the cases brought to our notice by the Yorkshire Bottlemakers' Society, have seen the medical man who had certified to the incapacity, and have searched the record of cataract cases admitted, during the three years 1903-1905, to the General Infirmary at Leeds, which is in propinquity to a number of places where this industry is carried on. The result was not only to confirm the accuracy of the figures, but also to satisfy us that, in addition to the cases enumerated, a noticeable number of other glass bottle finishers, gatherers and blowers, who for one reason or another could not appear upon the list, had either been operated on for cataract, or were suffering from it.

On the total for the three years 1903-1905 of the cases of senile cataract among men admitted to the General Infirmary, Leeds, about one out of every fourteen was a bottle finisher, blower, gatherer or founder. The only industry (except the indefinite class entered as "labourer") showing a greater number was mining—about one out of eleven.

We have endeavoured to ascertain what were the numbers of miners and of bottle makers respectively in the population from whom the patients in the Leeds Infirmary were drawn, in order that we might compare the average incidence of cataract in the two classes; but we have not been able to arrive at any figures that are properly comparable. Nor have we succeeded in finding any statistics which show the incidence of cataract in the general population, except some figures relating to Germany, which appear in the Appendix. The question, however, is one in which statistics are of the first importance. We cannot regard it as established that the form which cataract assumes among the workmen in this trade has symptoms sufficiently distinctive to allow its trade origin to be determined in individual cases. But we have little doubt that cataract is a trade disease among bottle-workers in the sense that it is unduly prevalent in that trade. If it were scheduled, the employers would not only have to compensate the cases which were due to the trade conditions, but also the cases not so due, for they could not disprove a trade origin in those cases. If it were not scheduled, the workmen who are not entitled to compensation would not be able to claim it, but the others who are so entitled would also be unable to claim it. If it were scheduled, but the burden of proof imposed on the workman, the effect would, we believe, be almost equivalent to not scheduling it at all, for the instances would be extremely rare, if indeed they ever occurred, in which the workman could prove to a Court that the cataract in his particular case had a trade origin.

We are of opinion that if cataract was found many times, for example, ten times, as frequently among bottle-makers as among other people, the disease should be scheduled, even though in one case in ten the employer would be required to pay compensation to a man whose disease would have occurred had he never been employed in that trade. On the other hand if it occurred only twice as often, we consider that it would not be just to schedule it, for the employer would be paying without due cause as often as with due cause.

The evidence on this subject has been collected, for the most part, towards the conclusion of our inquiry. The statistical investigation which we find to be essential to enable a well-founded decision to be reached, seems likely to occupy some time.

In view of the fact that the Workmen's Compensation Act comes into operation on 1st July, that a number of trades will be closely affected by the recommendations of our Report, and that many dispositions will need to be made before that date by Insurance Companies and others, we are unwilling to delay the publication of our Report for the sake of allowing these investigations to be undertaken. We would therefore recommend that our inquiries into the comparative incidence of this disease among glass-workers and among the rest of the population should be carried further, and that if, as we think is likely to be the case, it is found that the excess of cataract cases in that industry is sufficiently marked, the disease, although its trade origin cannot be differentiated in individual cases, should none the less be added to the Schedule.

23. *Injury to the Eyes from Repeated Impact of Fragments of Metal.*—The general Secretary of the Boilermakers' and Iron and Steel Shipbuilders' Society expressed the opinion that workmen employed in shipbuilding and similar trades were liable to injury to the eyes, not only from the impact of a fragment of metal at a particular moment (which would be an "accident"), but also from repeated impacts of such particles continued over a prolonged period. No medical evidence was tendered in support of this contention, although asked for by the Committee, and we do not think that the existence of any eye disease due to this cause is established.

24. *Injury to the Eyes from Electric Welding.*—Cases of such injury have occurred, due to the intensity of the light produced in the process. We have had no evidence, however, that incapacity, when it occurs, lasts for longer than a few days; and it appears that the injury can be easily avoided, and is in fact now avoided by the use of protective glasses by the workmen. In these circumstances there is, we consider, no valid reason for adding it to the Schedule.

IV.—DISEASES OF THE RESPIRATORY SYSTEM.

25. *Bronchitis.*—We have received much evidence to show that workmen exposed to certain kinds of dust and to the fumes of certain gases are specially susceptible to bronchitis. We cannot doubt that this ailment often has an industrial origin among dock labourers handling dusty cargoes, workers in some of the processes in flax mills, chemical workers who may inhale the fumes of chlorine or other irritating gases, tin-plate workers exposed to the fumes of hydrochloric acid gas and to dust, brass workers exposed to the fumes of deflagrating zinc and to dust, and men in other employments whose respiratory system may be affected by similar deleterious influences. Dr. Reynolds, of the Manchester Royal Infirmary, in his valuable evidence, expressed the opinion that a skilled practitioner might detect certain subtle differences between the symptoms of bronchitis due to the inhalation of dust and those of bronchitis due to other causes. This view, however, was not shared by the many medical men whose opinion on the point we invited. We cannot find that there is any sufficient means of differentiation that would enable the bronchitis which is of industrial origin to be distinguished in practice in individual cases, and for that reason we find ourselves unable to advise its inclusion in the Schedule.

26. "*Slag Cough.*"—Cough due to slight chronic inflammation of the bronchial tubes, induced by the extremely fine state of division into which basic slag has to be ground, was described to us as common among the mill workers engaged in this industry. This illness has some distinguishing features, and may be held to be specific to the employment, but it cannot be included in the Schedule for the reason that the evidence shows that it does not incapacitate for more than one or two days.

27. *Pneumonia.*—We have heard evidence to the effect that one of the ways in which the harmful consequences of inhalation of mineral dust may show themselves is pneumonia. Among workers in slate mills a low form of lobular pneumonia, liable to recurrence and indistinguishable from the ordinary form, seems sometimes to be a preliminary stage in the development of fibroid phthisis.

Basic slag bears an evil name in the causation of pneumonia, but the evidence we heard was inconclusive that basic slag workers in Middlesbrough suffer from it in much greater degree than the general population of that town, where, indeed, pneumonia is exceptionally prevalent. In any case, so far as we are aware, the disease presents no distinguishing symptoms, and accordingly there is no possibility of proof whether or not any individual case was of industrial origin.

28. *Phthisis and Pulmonary Fibrosis*.—A large part of our inquiry has been directed to the investigation of the diseases variously known as “miners’ phthisis,” “stone masons’ phthisis,” “potters’ rot,” “grinders’ rot,” and the like. To the difficult problem presented by these diseases we have given close and anxious consideration.

The pulmonary disease manifests itself in three kinds or forms—as ordinary tuberculous phthisis, acute or chronic; as “fibroid phthisis,” and as a mixed form when a tuberculous process is engrafted sooner or later upon the fibroid. Fibroid phthisis is always a slow disease. It consists in a chronic re-active inflammation around the many minute foci of dust inhalation, which by coalescence gradually invades large areas, impairing and strangling the proper lung tissues in corresponding measure. Again, a lung so impaired is very apt to harbour bacilli, especially the bacillus of tubercle, by the influence of which it may be still further destroyed. Thus both fibroid phthisis uncomplicated and fibroid phthisis with the supervention of tubercle are in their nature occupational diseases.

Moreover, there is little doubt that ordinary tuberculous phthisis prevails excessively among workers in gritty dusts, and that this excess is in some measure due to the injurious influence of such dust on the lungs of the workmen.

To consider first fibroid phthisis: the features of this disease, as induced by the inhalation of dust, have been described by many medical authors, attested by the witnesses who have appeared before us, and verified by the medical members of the Committee on our visits to ganister mines and grinding shops. The first symptom is a cough which insidiously, and for a while almost imperceptibly, becomes habitual. At first in the morning only, it gradually becomes more frequent during the day, and expectoration, nominal at the beginning, becomes more marked, though not profuse until the latter stages of the disease. Leaving out of account the more rapid progress of the disease in tin and gold miners, these symptoms of a negative phase of purely local damage may last for years—ten or fifteen or even more—without advancing to such a degree as to throw the workman out of employment or even to cause him serious inconvenience. At some period, however, rarely less than ten years, and frequently more than twenty, of continuous employment, in a like imperceptible manner the breathing gets shorter, and the patient finds himself less and less capable of exertion. Yet, even when the cough and dyspnoea have reached a considerable degree, there are no signs of fever, as is the case with pulmonary tuberculosis; the flesh does not fall and the muscles retain their strength and volume. Thus even at a period when the malady is fully established the general health may be but little impaired, and the patient may not be compelled to cease work. Herein fibroid phthisis presents a well-marked difference from pulmonary tuberculosis; and even if, as we have said, the disease becomes complicated with tubercle, yet the rate of progress may be determined rather by the character of the primary than of the secondary disease, though usually the supervention of tubercle hastens the sufferer into a more rapid consumption.

On examination of the chest during the period of fully established fibroid disease before its crippling or exhaustive stage, yet when cough, shortness of breath and imperfect aeration of the blood are notable enough, the physical signs are few and indefinite. Indeed it is in this very want of parallel between the symptoms and the signs of disease, and in the absence of serious bodily indisposition that negative evidence of the form assumed is to be obtained. The chest is remarkably motionless, the man seems deaf to the request to draw his breath, and the murmur of air entering and leaving the lungs is almost inaudible. A faint wheeze or click may be the only positive sign to the ear of the inward deterioration.

Diagnosis of the mixed cases, unless the infection by tubercle be very early and predominant, may present no little difficulty even to an expert who has before him the history of the individual, for the long period of chronic change, even in comparatively advanced stages, still may present the signs and symptoms of slow obliteration rather than of ulceration of the lungs.

A still greater difficulty of diagnosis, which in early stages may never get beyond

surmise, is between fibroid phthisis of other origin and chronic bronchitis with "asthma," or to use the technical term—emphysema. Fibrosis from other causes is however generally unilateral—one lung only being affected, whereas dust attacks both lungs impartially. It is thus from chronic bronchitis and emphysema that distinction is most difficult. The personal observations of the medical members of the Committee led them to regard the lungs affected with fibroid phthisis as differing from emphysema in the form of the chest, in the relative position of the lungs to other organs—those of emphysema being over-expanded and those the seat of fibroid phthisis tending to retraction; and in the difference of respiratory murmur, which in fibroid phthisis is notably silent, the inability to inspire being remarkable, while in emphysema the murmur, especially in expiration, is prolonged. The kind of expectoration also, which in uncomplicated emphysema is not distinctively purulent, and, in fibroid phthisis, the appearance under the microscope of the grit in the most intimate expectoration, together with the history of the case, the age of the patient, the absence or deficiency of other characters of constitutional deterioration, as, for instance, in the arteries, which are apt to accompany emphysema, would, generally speaking, guide the physician experienced in such cases to a right conclusion.

To this account of the symptoms we may add that if in an early stage of fibroid phthisis the workman leaves the dusty employment for work in agriculture or in other occupation in air free from irritating particles, the disease may be practically arrested; that is, although the part affected may proceed to obliteration, the disease would not extend to other parts of the lung, and the portion destroyed would be negligible as a factor of health and capacity.

Ordinary tuberculous phthisis cannot, of course, be regarded as a disease specific to any employment. It is widely prevalent throughout the population. We consider, however, that fibroid phthisis, in its later stages, and when the history of the case is known, can be clinically distinguished from tuberculous phthisis. We regard it as established that fibroid phthisis is a disease specific to the employment in the following trades:—

- (1) Grinders, continuously using either grindstones or emery-wheels for the abrasion of metals, especially steel. It must be understood that men whose employment is that of engineers, but who occasionally, and for comparatively short periods, use a grindstone to sharpen their tools or to file down a piece of metal to be fitted, cannot be considered specially liable to this disease.
- (2) Potters engaged in certain processes.
- (3) Masons employed on certain kinds of stone, especially if not working in the open air.
- (4) Tin miners, many of whom, in recent years, however, have contracted the beginnings of the disease while working in the exceedingly unhealthy conditions of the gold mines of the Transvaal.
- (5) Ganister miners, and to a less extent, men employed in certain processes of ganister brick-making.

In the case of men employed in slate quarries and in the works where slate is sawn and dressed, the incidence of fibroid phthisis has been established in some instances.

A case of typical fibroid phthisis in a man who had been employed in the working of asbestos was brought to our notice. We enquired from the Parliamentary Committee of the Trade Union Congress whether they could furnish us with further information as to the prevalence of the disease in this trade, but they were unable to do so.

We are clearly of opinion that coal miners are not liable to fibroid phthisis, and although cases of anthracosis—using the term to mean cases in which the lung is charged with coal-dust—are commonly met with, we cannot find that in any one that condition has proved to be a contributory cause of death.

Ironstone miners also do not appear to suffer from the disease. We have made careful inquiries into the incidence of fibroid phthisis in the boot trade and in flax-mills, but we find that the cases of phthisis occurring among persons employed in those industries are cases commencing as bronchitis and subsequently developing tuberculosis, which are often due to infection, to bad ventilation in the homes, or to chills contracted through wearing insufficient clothing when passing from the temperature of the factory to that of the open air, and which cannot in any case be distinguished as being caused by the nature of the employment.

Dr. Tatham, the Superintendent of Statistics at the General Register Office, has kindly supplied us with figures showing the comparative death rates from the various diseases of the respiratory system and from other diseases among the general population and among the men employed in certain selected occupations. The tables will be found in the Appendix. It has not been possible, however, to separate the death rates from fibroid phthisis from those of other diseases of the respiratory system, since medical men do not as a rule distinguish that disease when certifying the cause of death. There are, indeed, no statistics of any kind to be obtained from any quarter, except perhaps the death returns in limited areas of tin and ganister mining, which show the degree to which fibroid phthisis prevails in the trades that are liable to it. The classification of occupations in the Registrar General's returns does not correspond also with that of the trades in which fibroid phthisis is prevalent. For instance, it is not possible to draw any indication of the death rate from respiratory diseases among stonemasons from the death rate which is tabulated for the much larger class of "bricklayers, masons, builders."

The following facts, however, can be deduced from Dr. Tatham's tables. In the three years 1900-1-2, in England and Wales, among a given number of males, aged 25 to 65 years, in the general population, there died 1,000 persons from all causes; of these 186 died from phthisis, and 21 died from diseases of the respiratory system other than phthisis, bronchitis, pneumonia, and pleurisy. Owing to the want of uniformity in this particular in the method of certifying, some cases of fibroid phthisis will be returned under the former head, some under the latter. The second figure will include besides fibroid phthisis a few of the rarer diseases of the respiratory system. For our purposes we must add the two together, and we then find that among the given number of men of those ages belonging to all classes, 207 died of phthisis and fibroid phthisis, together with some comparatively scarce diseases. The corresponding figure among "potters, earthenware, &c., manufacturers" is 392; among "cutlers, scissors makers," 576; and among tin miners the remarkable figure of 1,257. Among agriculturists, on the other hand, the class which lives under conditions the least predisposing to these diseases, we have what may be termed a "natural" mortality figure of 96—a figure largely reduced from the corresponding figure a decade before. Roughly speaking, therefore, the death rate from these diseases among males, aged 25 to 65, was in those years twice as high among the general population as among agriculturalists, four times as high among potters, six times as high among grinders, and thirteen times as high among tin miners.

We hold the opinion, upon the evidence we have discussed, that fibroid phthisis is a specific and sufficiently distinguishable trade disease affecting the industries which we have named, and we consider that, on the principles of the Workmen's Compensation Act, the employers might properly be required to pay compensation to their workpeople who contract it.

Two difficulties, however, still present themselves. The first is not insuperable. It arises from the fact that since this disease is very slow in its development, and since the compensation charge would be a heavy one, it would not be right to lay the whole of the burden on the employer or employers under whom the workman had been serving during the twelve months prior to the incapacity, the parties who alone would be liable under the Industrial Diseases Section of the Act. That section, however, provides for its own modification by an order of the Secretary of State in respect of any diseases added to the Schedule. It would therefore be possible to require all the employers under whom the workman had served in the dangerous trade during a period of five years, unless they could disprove their liability, to share the burden of compensation; and it could be apportioned among them by the method already provided in the Act. The procedure, it is true, would be complicated and far from convenient; but if this were the only obstacle that stood between these victims of dangerous trade conditions and the compensation to which they would be entitled, we should not hesitate to recommend that this procedure should be followed. But the second difficulty is of a far graver character.

It will be clear from the description that has been given of the usual course of this disease that before the moment comes when its nature can be definitely diagnosed, some years may elapse during which the patient suffers from bronchitic or asthmatical symptoms which are in no way distinctive. No one can tell with certainty whether they are the preliminary signs of fibroid phthisis or whether they are not. A workman in one of the trades in question may, like other people, suffer occasionally from a cough in the winter months, or be incapacitated for a time by an attack of bronchitis; it by no means follows that if he remains in the trade he will be

the subject of fibroid phthisis, or in more than a slight and negligible degree. Indeed, in what is probably the majority of such cases, the workman does remain in the trade and does not suffer from fibroid phthisis either at all or to any important extent. We have had to consider what would be the effect on the prospect of employment of such men if employers were made liable to pay half wages during the remainder of the workman's life, or a sum equal to three years' wages on his death, should fibroid phthisis in fact supervene.

The disease stands on a different footing from all those which are now included in the Schedule, or which we recommend should be added to it. In no other case is there a long preliminary period during which there are symptoms which may, on the one hand, be arrested or disappear, or which may, on the other hand, become graver and ultimately declare themselves as the disease for which compensation is payable. Even in lead poisoning, which offers the nearest analogy, the cases are very rare where there is any prolonged uncertainty whether the worker is poisoned or is not. Moreover, the majority of cases of lead poisoning cause only a short incapacity and involve no heavy charge for compensation. But in every case of cough or bronchitis among workers in the trades we are now considering there will be uncertainty whether or not the symptoms will prove the preliminary to a disease which may be an incurable disease and which will almost always involve the payment of a large sum in compensation. It is obvious that employers will have a strong inducement to dismiss or to refuse to engage any workmen who show these symptoms.

If such men were able to claim compensation for loss of employment under these conditions, the fact would serve as a deterrent to the employers and might enable the men to keep their situations. But it appears impossible to devise any means by which such compensation could be secured to them. They could not claim it on the ground that they were suffering from fibroid phthisis, because the cases we are considering are those in which the distinctive symptoms of that disease have not yet appeared. They could not claim it on the ground that they had been dismissed because of their liability to the disease, for if such a claim were sanctioned by the law employers could give other reasons, or refuse to give reasons, for the action they took.

If, again, the effect of scheduling fibroid phthisis would be no more than the elimination—though perhaps prematurely—from these dangerous trades of men who, if they stayed in them, would sooner or later contract that disease, it might be held that, although some unnecessary hardship would be caused, the process would be in the long run in the best interest of the men themselves. But the elimination, if it took place at all, would extend far more widely than this, for the number of men who show symptoms which may possibly develop into fibroid phthisis is much larger than the number of those who will ultimately suffer seriously from the disease.

1020. The employers who appeared before us were almost unanimous on this subject. One of the representatives of the ganister trade, for instance, said :

1060. One of the first things it would be necessary for the company to do would be to have every man examined, and ascertain whether he had even the beginning of the disease upon him, and then I do not know what the result would be.

What you have wished to explain is this ; the result of placing this disease in the Third Schedule to the Workmen's Compensation Bill might be to bring about the wholesale dismissal of the men ?—I am afraid that that is the only course that would be open to us. We do not want to do it. If we had to dismiss these men it would paralyse our business for a time. There is no doubt about that, and, if we did not dismiss them, we should be taking over a liability that would be very serious.

10968. A witness speaking on behalf of the Engineering Employers' Federation said :

That is really a question whether by extending this compensation generally you do not directly force the employer to do such things. I believe that a good deal of the non-employment is caused in that way. The men say we do not care about employing men who are either old or in any way defective physically, because they are liable to land us in claims under the Compensation Act, and it is not at all unlikely, if an employer saw doubtful symptoms, he would dismiss the man. Of course, if there were decided symptoms of the disease, the man would have a claim, and it is not at all unlikely that the employers would like to have medical examination compulsory of all men who are taken on. It works both ways.

One of the representatives of the Boot and Shoe Manufacturers' Federation, speaking of phthisis generally, said :

10404. There is one point I omitted to mention, and that is, what a serious matter it would be for the workpeople themselves if this disease were scheduled, because every manufacturer would be bound to have the workpeople examined periodically, and if there was the slightest symptom of weakness they would have to go.

We received similar evidence from others who spoke from the employers' point of view. Nor was it only from that standpoint that this aspect of the problem was

urged upon our attention. Dr. Haldane, for example, whose impartiality in such matters will not be questioned, was asked whether in his opinion any practical difficulties would arise if this disease were scheduled. He answered :

I think there would be very serious difficulties, and that they would tell very heavily against the men.

3100-2

Will you explain why?—What would happen, I am sure, in the case of the mines in Cornwall, for instance, would be that they would not employ men who had worked for a long time previously in mines, and particularly men whom they suspected of having done dangerous work abroad. There are a great many men, first-rate miners, who come home to Cornwall from India, the Transvaal, and various other countries.

Would they say "You men are in a condition in which phthisis is likely to break out, and then we should have to compensate you, therefore we will not employ you"?—Yes.

Dr. Oliver, the author of the volume on "Dangerous Trades," and a member of the Departmental Committee on Dangerous Trades, of which Mr. H. J. Tennant, M.P., was Chairman, was examined on this point as follows :—

There would probably be many men now employed in ganister mines, or as stonemasons, or in other trades, who each winter have attacks more or less severe of bronchitis, which might develop in the course of time into fibrosis, but which, on the other hand, might not ; do you think it possible to say in the case of those men whether it will develop into fibrosis or not?—It is not possible.

10649-55.

Therefore, it would be impossible for them to claim compensation for fibrosis, or its preliminary symptoms?—I think so.

On the other hand, the employer would know if it did develop into fibrosis he would be liable to pay compensation if the Home Secretary schedules it?—Yes.

In those circumstances, do you think it would be to the interest of the work-people to schedule fibrosis ; do you think they would gain more or lose more?—In North Country mining districts, away from the ganister mines, it would be no gain to them at all.

I am considering the trades which I have mentioned—ganister mining, tin mining, grinding, and stonemasons' or potters' work. What do you say, the point being the wholesale dismissal of suspected men?—That is a very serious question to give an answer to, because there are so many things leading up to bronchitis. I do not think you can deal with it just in that general way. The fibrosis of the lungs in a gold miner is typically developed, and is quite a different thing from what the ordinary practitioner sees amongst miners generally. It is not the same thing at all, and there is very little bronchitis accompanying it. The symptoms are so different, the man is short of breath, he has sometimes no physical signs, and one is struck with the great disparity between the absence of physical signs or the comparative fewness of the physical signs and the amount of difficulty in breathing and distress.

Still there is a stage, is there not, in the development of the disease when its symptoms are not characteristic?—In the early stages particularly.

That is the stage in which possible danger to the workmen may be, not a physical danger, but an economic danger of losing his employment for fear, on the part of the employer, of his being made a charge upon him for the rest of his life for compensation for fibrosis. Have you considered, speaking as you do with great expert authority on the question of industrial diseases, whether it would be more in the interests of the working classes in those trades which are likely to develop fibrosis to schedule this disease or not to schedule it?—I do not know how to reply to that question on the spur of the moment. It is a very difficult problem, and requires careful consideration. If you took men away from their work at that particular stage, I do not know that you would have any guarantee that you would check the fibrosis—the thing may be deeper than the bronchitis would lead you to infer, and the damage may be already well on the way. It may have been inflicted, and you would have the changes following. It would be a hardship, I think, in many instances, to simply dismiss a person because he has bronchitis, and yet, on the other hand, there is no doubt that bronchitis is one of the first conditions noticed, not necessarily with expectoration, because it is not accompanied by expectoration sometimes at all. I really could not say which would be the better thing to do for these people, whether to schedule it or not. You will have a great many people thrown out of employment, and what are they to do, because so many trades are dusty.

By the witnesses who spoke on behalf of the workmen in these trades differing views were expressed. The Secretary of the Operative Masons' Society recognised the difficulty, but thought the disease should nevertheless be scheduled.

Admitting for the moment for the sake of discussion that fibroid phthisis is a trade disease among stonemasons, and that numbers of them die of it, and that it would be quite reasonable for the employers to be made to pay compensation, the point I put is, is it to the advantage of the stonemasons—the working men—to include this disease, with the possibility that no one may ever get the compensation, because men who showed the preliminary symptoms would straightway be dismissed?—Yes, but my society is of opinion that we should try to get it incorporated in the Act under dangerous diseases. We have taken a resolution on it.

10301-4.

Have your society considered that point?—I think so. I agree with you that in many respects it would be detrimental to us, and an employer would be very careful not to employ men who looked anything like consumptive. I quite agree that it would have that effect, but at the same time my society thinks it should be included in the dangerous diseases for compensation. I think they have studied both sides of the question.

Are you aware that it has been said that the Workmen's Compensation Act already prevents men who have some physical defect, such as the loss of one eye, or who may be infirm in some way or other, from getting employment because employers will not take the risk of their having an accident?—I believe that is so.

Would not that be very greatly increased in the case of phthisis, which is unlike lead poisoning and anthrax and phosphorus poisoning, because it is a disease which takes a longer period to develop. You cannot say a man has got the disease, and he must stop work and get compensation, as there might be five,

eight, or ten years of preliminary symptoms; and during that period he may be liable to dismissal and lose his work altogether, might he not?—Yes, we have seen that difficulty. Ours is casual employment, too. One of our men may work three or four months in a year for one firm, and three or four months for another firm. We have very few who are employed permanently. We have reviewed these difficulties, and my society is anxious that it should be included if the Committee can see their way to do it.

The representatives of the National Amalgamated Society of Male and Female Pottery Workers held similar views.

9387. There is another point, which has rather exercised the minds of the Committee, which I should like your view upon. Suppose potters' asthma or the disease which goes by that name were scheduled under the Workmen's Compensation Act, and the employer was liable to pay, perhaps, half wages to a man for many years until he died, do not you think the employers might get rid of all the men in their works who showed symptoms of the disease before they were incapacitated?—We have looked at that difficulty somewhat, but our society thought that at some time or other, when any reform had to be made, somebody had to suffer, and if the older men to-day have to suffer we shall have to abide by it, but we shall be doing a good thing for the people that are to come after us.

9396. We should be very glad to know whether on the whole you are prepared to face the risk of men being discharged through this liability to compensation falling on the employer?—My society has authorised us to say that we are prepared to take the risk.

Dr. Robert Owen, who gave evidence in support of the proposition that slate quarrymen suffer from pulmonary diseases through their employment was, however, of an opposite opinion on this part of the question.

8420-3. The disease of which we are speaking at this minute is fibroid phthisis, arising from dust, is it not?—Yes.

If that or something equivalent to it was put into the schedule, do you anticipate at once considerable hardship to the old men?—To the younger men. We find the disease mostly in the middle-aged men.

I will put it with regard to men who have it already, and who would probably be discharged?—Anybody with a cough or a slight catarrh might be stopped at once.

Can you suggest any means whereby this hardship could be obviated?—No, I do not think I could suggest anything.

The same view was expressed by the Secretary of the Sheffield United Cutlery Council, which is a federation of the Trade Unions in the Sheffield cutlery trade.

10905-8. Fibrosis takes a very long period, and what the Committee are afraid of is, that while the disease is in its early stages, invariably the man would be discharged?—Yes, I daresay there would be that danger.

And consequently no one would get any compensation. There would be no pressure on the employer to improve the conditions, and the only result would be that a considerable number of men, who might not develop fibrosis at all, as a matter of fact, would be thrown out of employment?—Yes, I see, of course, there is that danger.

Do you think it is a real danger?—I think it is a real danger.

Looking at it solely from the point of view of the workmen, admitting that the workman has a perfectly just claim against the employer for compensation for fibrosis, and that Parliament would be fully entitled to call upon his employer to pay, do you think, taking all the circumstances into consideration, it is to the advantage of the workmen in the trade that this disease should be scheduled?—I am rather inclined to think not. I think it would be scarcely to the workman's advantage. I can see many disadvantages, and it is not the same as an accident.

We have considered whether any method could be devised of scheduling the disease while avoiding these consequences that are said to be likely to ensue. It would be possible to allow an interval of some years, during which the men now engaged in these trades who show preliminary symptoms would either recover or, becoming more seriously affected, would leave the employment. But this course would merely postpone, it would not avoid, the dangers that are foreseen, and as the interval drew to an end the difficulty would be as great as it is now. An alternative course would be to provide that the compensation for fibroid phthisis should be on a lower scale than that for accidents and for other diseases. *Pro tanto* the alleged insecurity of the workpeople's position would thereby be lessened; but it would not disappear, and the purpose in view would not be fully effected. Nor could this plan be adopted, in our opinion, without legislation, for an alteration in the scale of compensation payable in respect of a particular disease can hardly be counted a "modification" of the Industrial Diseases Section such as the Home Secretary has power to make.* It should not be forgotten, also, that a proposal to allow men suffering from some infirmity to contract on to a lower scale of compensation for accidents, in order to better their chances of securing employment, was rejected by the House of Commons in 1906. In view of these circumstances we cannot recommend the adoption of this plan.

After much anxious consideration we have arrived at the conclusion that work-

* Mr. A. H. Ruegg, K.C., is of opinion, however, that it might, perhaps, be so considered.

men, whose regular occupation exposes them to the inhalation of silicious or metallic dust, and who develop fibroid phthisis suffer from a trade disease sufficiently distinguishable and specific to their employment ; but that, on account of the considerations which we have described, we cannot recommend the immediate addition of this disease to the schedule. The evidence which we have quoted cannot be ignored. The matter demands more deliberate consideration than it has yet received on the part of the employers and workpeople concerned. It may be that public discussion of the question will lead to the conclusion that the fears which have been expressed are exaggerated. It may be that in some or all of these trades schemes of insurance will be devised which will meet the difficulty. We consider that it would be the more prudent course to keep in abeyance for the time being the question of scheduling this disease.†

V.—MISCELLANEOUS.

29. *Glanders*.—Persons, whose occupation brings them into contact with horses, asses, or mules, sometimes become affected by the disease of glanders, to which these animals are liable. The death returns published by the Registrar General show that during the last twenty years about four deaths annually have been due to this cause. In the horse two forms are recognised, “glanders” and “farcy,” the former of which is characterised by discharge from the nostrils, the latter by the formation of nodules and abscesses in the skin and swellings along the course of the lymphatic vessels, termed “farcy buds.” In man the symptoms may be acute, with development first of a characteristic eruption on the body, and accompanied later by discharge from the nasal passages ; or they may assume a chronic form. The disease is caused by a bacillus, *bacillus mallei*, present in the discharges, and although the symptoms of the disease clinically are fairly definite, diagnosis can always be verified by discovery of the bacillus. Knackers who deal only with the carcase of a glandered animal rarely contract the disease, because the bacilli are practically confined to the lesions and to the discharges from them, and the hands of the knackers are not usually brought into contact with the discharges at all. But it would be clearly an occupation disease if it occurred in a man either having the care or handling the carcase of an equine animal infected with the disease, and we recommend that it should be added to the Schedule.

30. *Grease* is a form of blood poisoning alleged to be due to infection from horses suffering from boils, but we have been unable to obtain from the London Carmen’s Union, by whose representative the matter was brought to our notice, any definite evidence, from medical men or others, with regard to it.

31. *Compressed Air Illness*.—The bodies of men, who work under conditions of compressed air, dissolve an excess of air, and if they return to the ordinary atmosphere without a sufficient interval to allow of gradual decompression, bubbles of nitrogen are set free in the blood and tissue fluids, which give rise to protean symptoms such as vertigo, muscular pains, paralysis, blindness or other effects—slight, severe, or fatal according to the structures through which the bubbles may force their way. This illness, sometimes known as “caisson disease,” from the increasing employment of men in caissons for bridge building, tunnelling and other engineering works, is plainly due to the employment. The number of fatalities has been few, but cases of illness have been numerous. The onset of symptoms is always a question of hours, and in so far as they are the result of a mechanical lesion from the escaping bubbles, there is little to distinguish the disease from an accident. It is doubtful, however, whether the Courts would hold that compensation would be payable in these cases on the ground of “accident.”

Inflammation of the ear may arise as a direct result of working in compressed

† Active efforts have been and are being made to protect the workers in these trades from the effects of dust inhalation. Special Rules under the Factory Act have been in force in the Potteries since 1898, and the evidence we have received shows that the incidence of fibroid phthisis has greatly diminished in consequence. Following upon the Report of the Departmental Committee on the Health of Cornish Miners, Special Rules were imposed in 1905 in the metalliferous mines of Cornwall and Devon. For the ganister mines also Special Rules, under the Coal Mines Regulation Act, were issued in 1905. An inquiry has lately been held into the conditions of labour in the Sheffield cutlery trade, with a view to the adoption of more stringent measures for the prevention of dust than those now in force.

air, and the ear mischief is to be expected if any inflammatory condition interferes with the power of equalising the pressure inside and outside the drum by the act of swallowing. Similarly, persons, on first entering compressed air, are liable to injury from ignorance of how to open their eustachian tubes, and effect this equalisation of pressure. Vertigo is frequently complained of.

Workers in caissons are occasionally exposed to risk of poisoning by carbonic oxide, arising from imperfect combustion and insufficient ventilation, by sulphuretted hydrogen, and by other poisonous gases developed in the caisson itself, the symptoms of which must not be confused with compressed air illness.

The symptoms of compressed air illness are largely subjective, but there should be little fear of abuse on this ground.

The evidence is conclusive that, provided sufficient time for decompression is allowed so as to permit the dissolved air to be given off from the lungs, the disease is entirely preventible.

All workmen required to carry on their work in compressed air should be entitled to claim compensation for such injuries under the general heading, "Compressed Air Illness or its Sequelæ."

32. *Dilatation of the Heart.*—Dilatation of the heart was described by a medical witness as occurring among "rollermen" in the steel mills of South Wales. The symptoms of "senile heart," as the witness described the condition, were observed in men between 40 and 50 years of age. The symptoms were shortness of breath on extra exertion, and the clinical signs a peculiar murky colour of the skin, blurring of the first heart sound, enlargement of the heart, and atheroma of the vessels. Temporary improvement follows on rest and treatment. The Committee had an opportunity of seeing the arduous nature of the work carried on under high pressure as piece-work, in the course of which some 180–200 steel plates, each weighing from 20–26 lbs., pass through the hands of the workmen five times in the eight hours. Cases were cited by Dr. Scott of direct injury to the valves of the heart from sudden violent strain which, were proof possible, would constitute the injury an accident. But generally it is some violent exertion that first directs attention to pre-existing illness, recognised by the medical man as cardiac. Cases of the gradual reduction of the reserve force, which ordinarily enables the heart to meet continuous increased muscular exertion, may be found in any laborious occupation among men who work with great intensity. These conditions cannot be said to be due to the nature of any trade or trades, and consequently are not covered by the terms of the Industrial Diseases Section of the Workmen's Compensation Act.

33. *Neurosis due to Vibration.*—Our attention was called to neurosis due to vibration, caused by the use of pneumatic tools. Tremor and sleeplessness have occasionally been observed in individuals, but no evidence was obtained of the existence of any nervous disease from this cause which incapacitates from employment.

34. *Dining car Attendants' Diseases.*—A witness urged that the attendants on railway dining-cars were specially liable to rheumatic fever and lung diseases through the alternation of temperatures to which they are subjected, and to varicose veins and neurosis owing to the vibration of the cars. The statement was quite unsupported by definite evidence, and we have no reason to think that it is well-founded.

35. *Anæmia among Photographic Workers.*—At the request of the Women's Industrial Council we heard the evidence of a medical man, who suggested that employment for long periods in dark rooms in the manufacture of photographic materials might be a cause of chronic anæmia. The witness consented to appear before us only on the condition that his name should not be made public, and as we are of opinion that we should not publish anonymous evidence, we find ourselves debarred from printing a report of his examination. It will suffice to say, however, that the contention was based on only four cases of anæmia, two of them in young women and two in young men; that the representatives of the Amalgamated Society of Lithographic Artists, Designers, Engravers, and Process Workers, who subsequently appeared before us, many members of whose Society work in dark rooms, had no knowledge of such a disease prevailing in the trade; and that we do not regard its existence as established.

36. *Illness Contracted in the Removal of Night-Soil.*—It has been alleged that men engaged in this work, or in the cleaning of sewers, contract erysipelas, typhoid fever, blood poisoning and similar infective diseases as the result of their employment. We print in the Appendix a letter on this subject from Mr. H. Orbell, Secretary of the Dock, Wharf, Riverside, and General Workers' Union of Great Britain and Ireland, and the answer to the inquiries we made into the cases in Middlesbrough referred to in that letter. Evidence was also given before us by Mr. Fitzmaurice, Chief Engineer of the London County Council, and Dr. R. J. Collie, the Medical Examiner to the Council, whose duty it is to examine cases of sickness among the Main Drainage Staff, numbering 920 men.

We are of opinion that no excessive prevalence of typhoid fever, erysipelas, and the like, among night-soil men, as compared with the rest of the population, has been shown to exist; the careful records kept of the illnesses contracted by the Main Drainage Staff of the London County Council are strong evidence, indeed, to the contrary. Nor do these maladies, when they occur among that class of men, show any distinctive features which would establish a causal connection with the employment. We cannot therefore advise their addition to the Schedule.

VI.—INJURIES NOT DUE TO ACCIDENT.

37. "*Beat Hand*" (Subcutaneous Cellulitis of the Hand).—This is an acute inflammation of the subcutaneous tissues of the hand or palmar side of the fingers, the result of friction of the pick on the hand. There is inoculation with an infective poison, probably through an abrasion. The inflammatory process becomes suppurative, and the products, confined by the dense skin over the palm, track in directions where the resistance of the tissues is least, usually to the back of the hand, but sometimes along the tendon sheaths. Except in the rare event of the inflammation terminating in resolution, operative interference becomes imperative. The figures of the Northumberland and Durham Miners' Permanent Relief Fund, with a membership of 37,657, showed 55 cases of beat hand in 1905, with an average duration of incapacity of 21·89 days, and 52 cases of the corresponding affection of beat knee, with an average duration of 24 days. Complete recovery is almost invariable, although a few instances were cited in which various slight deformities of the fingers or hands had resulted. We are satisfied that to constitute beat hand the inflammation must be acute, a fact which distinguishes it from the chronic puckering of the skin known as Dupuytren's contraction.

The complaint is not limited to miners, but may occur from similar causes among workmen using a variety of tools other than the pick. It is among miners, however, that it is specially prevalent, and we consider that when it occurs among them, compensation should be payable, unless the employer can prove that it was contracted outside the employment, while in other trades the burden of proof may properly rest on the workman.

38. "*Beat Knee*" and "*Beat Elbow*."—These may be considered together. The inflammation is of the same acute nature as in beat hand, but as they occur, the one in connection with the patellar bursa of the knee, the other with that over the olecranon process of the elbow, the condition is an acute bursitis, usually suppurative. As in beat hand, there is probably septic infection through an abrasion produced in kneeling or friction against the elbow.

These are in the same category as beat hand, and should equally be included in the Schedule.

39. *Sprained Wrist and Teno-Synovitis.*—We have received evidence to show that inflammation of the synovial lining of the wrist joint and tendon sheaths may occur among miners, not through accident, but through a long succession of jars to the wrist due to working a pick in hard coal. A miner is incapacitated from this cause for varying periods of time, in large measure dependent on the attention paid to it in the first instance. The consequences of neglected sprains may be serious, and lead to formation of fibrous adhesions in and round the joint. Its presence can nearly always be detected by swelling of the part, and in the case of teno-synovitis the constant friction of the tendons within their sheaths sets up a roughening by the deposit of lymph, with consequent crepitating sensation when the hand is placed over the affected part. We recommend the addition

of this injury to the Schedule, under the designation of "Inflammation of the synovial lining of the wrist joint and tendon sheaths."

40. "*Housemaid's Knee*."—This is a colloquial name for a pre-patellar bursitis, caused by kneeling. It is a less serious ailment than beat knee among miners, but it may incapacitate for two or three weeks, and in rare cases for a longer period. It is distinctly an occupational disease among domestic servants, but we are led by two considerations not to recommend its inclusion in the Schedule. In the first place the employer of a domestic servant is legally obliged either to give a month's notice or to pay a month's wages before discharge; "housemaid's knee" very seldom incapacitates for a period longer than a month, and never for a period much longer than a month. In the second place it is avoidable by the simple method of kneeling on a proper mat. We have received no representations from any quarter asking for its inclusion.

41. *Hernia*.—The evidence which we have received from authorities of eminence is definitely to the effect that hernia may, though very rarely, be due to a sudden strain—in which case it would be the subject of compensation, if caused by the employment, as an accident. But what usually happens is that some cough or particular strain brings down a little further a hernia, which has been slowly developing, so as first to make it prominent and attract attention. Hernia is never the result of a series of strains undergone in the course of employment, and cannot be regarded, among workmen in any trade, either as an industrial disease or as an injury, not being an accident, due to their employment. In these circumstances, hernia cannot be included in the Schedule.

42. *Boilermakers' Deafness*.—This is unquestionably an injury due to employment, and is widely prevalent among men working in the incessant noise of the ship-building yard or the boilermaker's shop. It does not, however, prevent a man from continuing at his trade, and it cannot, therefore, give rise to claims for compensation on the ground of incapacitation.

RECOMMENDATIONS.

Our recommendations may perhaps be summarised most conveniently in the shape of a tabulated list, following the form which was adopted in the Third Schedule of the Workmen's Compensation Act. If our proposals are accepted, the additions to that schedule might be framed as follows:

| Description of Disease. | Description of Process. |
|---|---|
| Poisoning by nitro- and amido-derivatives of benzene (dinitro-benzol, anilin and others), or its sequelæ. | Any process involving the use of a nitro- or amido-derivative of benzene, or its preparations or compounds. |
| Poisoning by carbon bisulphide or its sequelæ. | Any process involving the use of carbon bisulphide, or its preparations or compounds. |
| Poisoning by nitrous fumes or its sequelæ | Any process in which nitrous fumes are evolved. |
| Poisoning by nickel carbonyl or its sequelæ. | Any process in which nickel carbonyl gas is evolved. |
| Arsenic poisoning or its sequelæ - - | Handling of arsenic, or its preparations or compounds. |
| Lead poisoning or its sequelæ. - - | Handling of lead, or its preparations or compounds. |
| Poisoning by <i>Gonioma Kamassi</i> (African boxwood) or its sequelæ. | Any process in the manufacture of articles from <i>Gonioma Kamassi</i> (African boxwood) |

RECOMMENDATIONS—*continued.*

| Description of Disease. | Description of Process. |
|---|--|
| Chrome ulceration or its sequelæ - - - | Any process involving the use of chromic acid or bi-chromate of ammonium, potassium, or sodium, or their preparations. |
| Eczematous ulceration of the skin produced by dust or caustic or corrosive liquids, or ulceration of the mucous membrane of the nose or mouth produced by dust. | |
| Epitheliomatous cancer or ulceration of the skin or of the corneal surface of the eye, due to pitch, tar, or tarry compounds. | Handling or use of pitch, tar, or tarry compounds. |
| Scrotal epithelioma (chimney-sweeps' cancer). | Chimney-sweeping. |
| Nystagmus - - - - - | Mining. |
| Glanders - - - - - | Care of any equine animal suffering from glanders ; handling the carcase of such animal. |
| Compressed air illness or its sequelæ - - | Any process carried on in compressed air. |
| Subcutaneous cellulitis of the hand (beat hand). | Mining. |
| Subcutaneous cellulitis over the patella (miners' beat knee). | Mining. |
| Acute bursitis over the elbow (miners' beat elbow). | Mining. |
| Inflammation of the synovial lining of the wrist joint and tendon sheaths. | Mining. |

CONCLUSION.

Of the diseases which we recommend should be added to the Schedule, some are seldom seen by medical men, and occasionally difficulties of diagnosis may arise. We think it most desirable that the Medical Referees who will be appointed to adjudicate on medical points in disputed cases should be specialists, with particular knowledge and experience of these diseases.

Although we have made every effort, by announcements in the Press, by communication with the Parliamentary Committee of the Trade Union Congress, and by inquiries from our witnesses, to ascertain the existence, in order that we might investigate the circumstances, of every form of industrial disease, it may be that some cases of little known ailments have escaped our notice. The Act, however, empowers the Home Secretary to add to the Schedule at any time, and should further diseases of industrial origin be brought to light we do not doubt that inquiries will be undertaken, and, if proper, further additions made.

In the course of our inquiry many suggestions have been advocated for the prevention, in one way or another, of various forms of industrial disease. All these suggestions have been noted by the Factory Department of the Home Office, and doubtless they will be put to the best use.

We would conclude by expressing our very real sense of obligation to our Secretary, Mr. Elliott, for the painstaking and efficient service he has rendered during

a somewhat long and laborious enquiry. For a few weeks, during which Mr. Elliott was absent on account of ill-health, the duties of Secretary were performed by Mr. Bettany, of the Home Office, for whose capable assistance we would also express our thanks.

We have the honour to be,

Sir,

Your obedient Servants,

HERBERT SAMUEL.

HENRY H. S. CUNYNGHAME.

T. CLIFFORD ALLBUTT.

THOMAS M. LEGGE.

FRANK ELLIOTT.

15th May 1907.

DEPARTMENTAL COMMITTEE ON COMPENSATION FOR
INDUSTRIAL DISEASES.

REPORT

OF THE

DEPARTMENTAL COMMITTEE

ON

COMPENSATION FOR INDUSTRIAL DISEASES.

MINUTES OF EVIDENCE, APPENDICES, AND INDEX.

Presented to both Houses of Parliament by Command of His Majesty.



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1907.

MINUTES OF EVIDENCE

TAKEN BEFORE THE

DEPARTMENTAL COMMITTEE

ON

COMPENSATION FOR

INDUSTRIAL DISEASES.

FIRST DAY.

Friday, 26th October 1906.

PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Sir JOHN MACFADYEAN, M.B., called in, and examined.

1. (*Chairman.*) You are the President of the Royal Veterinary College?—I am the Principal of the Royal Veterinary College, and I happen also to be President of the Royal College of Veterinary Surgeons for this year.

2. And, of course, you have had great experience of the disease of glanders?—Yes, I have had a large experience of glanders.

3. Could you tell me whether any animals are affected by it besides horses, and, if so, what animals?—Well, occasionally donkeys are infected, but the number of them is so small that one rarely sees a case of spontaneous or naturally contracted glanders in the donkey; it is altogether an equine disease.

4. Is it as prevalent among donkeys in proportion to their numbers as among horses?—No, I believe not.

5. But cases do occur?—Well, it is well known that the donkey is really more susceptible than the horse. I have never myself seen, so far as I remember, a naturally contracted case in the donkey.

6. It may be contracted in other ways, by infection, you mean?—No, I mean putting aside experimental cases.

7. (*Mr. Cunyngame.*) Do you say that the donkey is less susceptible than the horse, or more so?—It is more susceptible than the horse.

8. The donkey is?—Yes, it is more readily infected experimentally, and therefore presumably in natural ways also.

9. (*Chairman.*) And mules?—Probably they have an intermediate degree of susceptibility.

10. But oxen are not so susceptible to it?—No.

11. Now, glanders can be transmitted to human beings?—Yes.

12. Have you personally had experience of such cases?—No. Personally I have never seen a human being affected with glanders.

13. But you know from your general medical knowledge that cases occur?—Oh, yes. *Sir J Macfadyean, M.B.*

14. And that they are transmitted simply by infection, by having to do with animals which are suffering from glanders?—Yes, I think it may be taken as certain that all human cases are equine in origin. 26 Oct. 1906.

15. In origin?—Equine in origin, though of course the possibility is not excluded that a human being suffering from glanders might infect another, but I have never heard it suggested that such a thing has occurred.

16. The disease, of course, would be contracted at a definite moment; it would not be a disease of gradual origin in a human being?—No.

17. And, if contracted, it is a serious disease?—Yes, I believe there is a very general opinion that it is an almost invariably fatal disease in the human subject. A similar opinion was until not very long ago held with regard to the disease in equines; we now know that that was absolutely an error, and it is therefore quite possible that there are mild cases of glanders in men also, which may even pass undetected or terminate in recovery.

18. But if the case is serious it can be clearly distinguishable as being glanders?—No. I believe that an absolutely certain diagnosis in man probably cannot be made except by bacteriological methods; at any rate, that is so in a great many cases in horses. What might be called the ordinary clinical characters of glanders in horses are in many cases so distinctive and characteristic that there is no great risk of error in basing a diagnosis on these characters; but there are a great many cases in which a positive diagnosis cannot be made except by showing that the glanders bacillus is present in the lesions, and that I believe to be the case in human glanders also.

19. But by bacteriological methods you can tell with certainty whether a person is suffering from glanders?—Yes, with absolute certainty.

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fadyen, M.B.
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20. Have you any knowledge of the extent to which glanders prevails amongst human beings?—Only such information as appears in the returns of the Registrar-General, and such information as I have obtained from knackers, who, one might have supposed, would be exposed to quite special risks.

21. Yes?—With regard to the incidence of glanders as disclosed by the returns of the Registrar-General, I believe that the average number of cases reported annually for about the last 20 years is four; but my impression is that probably a considerable number of cases are not diagnosed as glanders.

22. Being mild cases?—No, not "being mild cases"—I mean even fatal cases. The disease being so rare among human beings, it necessarily follows that very few medical practitioners have ever seen a case of human glanders, and when that is the case with regard to any disease, I think mistakes are likely to arise—that the disease may be mistaken for other morbid conditions such as are popularly called "blood poisoning," and suppurations and pneumonias, and so on.

23. Unless bacteriological tests are made?—Yes, or unless the person making the diagnosis has had previous experience of cases of glanders in man.

24. Should you say that any particular class of persons in the population was specially liable to contract glanders?—Yes, there is no doubt about that—that it is grooms and ostlers and those who have to work with horses who form the bulk.

25. And knackers?—No, strange to say, there are very few cases amongst knackers. About two years ago I obtained information from the manager of Messrs. Harrison, Barber and Company, the large horse slaughterers, in London here, and I believe that during the last ten years they must have passed through their hands nearly 2,000 glandered carcasses annually; roughly speaking, in the ten years I should think they have dealt with something like 20,000 cases of glanders—glandered horses, the great majority.

26. (Professor Allbutt.) In how many years did you say?—In ten years—somewhere between 1,500 and 2,000 cases annually; the majority of these carcasses are eviscerated, partially skinned, and this is done by knackers, with bare arms and hands, and one would have thought that they must necessarily be exposed to very considerable risk, but I am told that during these ten years not one single case of glanders has occurred amongst the employees. At the Veterinary College we deal with a considerable number of cases of glanders annually, and I believe in the past 50 years no College servant has contracted glanders. The circumstance is really easily explained. Glanders is not a disease in which the bacilli which are the cause of it are universally distributed throughout the carcass; the blood, for instance, is rarely infective, and the apparently healthy tissues are generally free from the bacilli. The bacilli are practically confined to the lesions of the disease and to the discharges from those lesions—the pus that escapes from the abscesses in farcy, for instance, and the nasal discharge are highly infective. In the evisceration of a carcass these discharges are not necessarily and not usually brought into contact with the knacker's hand at all. On the other hand, ostlers and grooms who are tending the glandered horses with discharges are very likely to be careless and not take precautions to avoid getting such discharges on their hands, and therefore they are exposed to very considerable risk, especially if they have any abrasions about their hands, and, probably, even apart from that, by the application of soiled fingers to their own mucous membranes. It is not even outside the bounds of possibility that they might infect themselves by contaminating their own food.

27. (Chairman.) Should you say that if any person whose business it was to have care of horses contracted glanders, the presumption was that he contracted the disease in the course of his employment?—When the groom or other person contracts glanders?

28. Yes.—I think it amounts to a practical certainty that he has contracted the disease through his association with a glandered horse, and in the great majority of cases I believe it is quite easy to trace such association. When the cases are investigated immediately, it usually turns out that the man has been attending to what is called a clinically glandered horse—a horse obviously glandered—with a nasal discharge for instance, or a horse affected with so-called farcy, which is simply glanders with lesions in the skin.

29. Would the term "glanders" be certainly interpreted by any court to cover farcy?—It is defined by the orders of the Board of Agriculture now that they are the same thing.

30. Would a case be possible in which a man had contracted a disease which was certainly glanders, while among the horses which he had been tending there was doubt as to whether any of them had contracted glanders?—Yes; there might be doubt as to whether any of the horses were glandered or not. It is conceivable that a horse might infect a human being although he displayed no characteristic outward symptoms of the disease.

31. Although he displayed no characteristic symptoms of the disease?—Before he displayed any—just in the same way as there is reason to believe that a horse affected with glanders, but not yet manifesting outward circumstances, may infest a fellow horse; but I believe that that very rarely occurs. The amount of infective material leaving the body of a glandered horse before he is visibly glandered is really small, and the chances of it infecting the human attendant are proportionally small—one might almost say infinitesimal. It is when the horse becomes clinically glandered with a discharge of material from the nose or of pus from abscesses that the case becomes very dangerous to the attendant.

32. But a case might conceivably occur in which a person in charge of horses contracted glanders, but would not be able to prove in a court of law that any particular horse under his care was suffering from glanders?—Yes, I believe that to be so.

33. But in your opinion there would be a very strong presumption that, if he contracted glanders, and if those were the only horses that he had to do with, one of them must have been infected with glanders?—An exceedingly strong presumption.

33*. Cases of glanders, of course, among horses may be mild, and the horse may recover without anyone being certain that the horse had had glanders at all?—That is so.

34. (Professor Allbutt.) I know, Sir John, that you say that the diagnosis of glanders is partly a matter of previous experience; that applies, of course, to horses as well as to men, does it not?—Yes.

35. What do you think about the use of mallein as a means of diagnosis?—In a horse?

36. In a horse.—There is a great amount of experience to prove that it is of almost inestimable value in the diagnosis of glanders.

37. I ask this, of course, with the very strong desire to make no reflection upon anybody:—I mean, in improving the sanitary conditions would it be desirable that any more care should be taken in large livery stables, for example, by the use of mallein or otherwise to detect this latent form of glanders to which you refer?—Well, that is a subject which has been much discussed and was considered by a Departmental Committee which sat a few years ago to deal with glanders. While the Committee came to the conclusion that mallein was an agent of great value for diagnosis, they did not recommend that the necessary powers should be taken to compel owners to submit their horses to the use of mallein, and in the meantime it is not possible to enforce the use of mallein, but all are agreed that it would be a great assistance to the actual suppression of glanders if mallein could be compulsorily employed on all horses legitimately suspected of having been exposed to the infection—having been stable companions of a horse proved to be glandered.

38. You have not the same advantage, of course, in registration, but do you suggest that glanders has increased or remained stationary, or has diminished?—The returns of the Board of Agriculture show that it fluctuates to a considerable extent from year to year, but, as compared with twenty years ago, it has increased. It has increased over the last five years as compared with the preceding five.

39. Do you think that is due to an improvement of diagnosis, or do you think that the disease is increasing?—Well, I think partly it may be that the disease is better reported, but, I think, there has also been an actual increase.

40. The spray from the nostrils of the horse is perhaps more important than discharges from cutaneous or other superficial lesions—I mean it is more likely to occur?—Yes, but I believe experience would indicate

that it is not anything like so dangerous as the gross discharge brought into contact with the skin or wounds.

41. As regards the improvements in diagnosis—I do not want, of course, to lead you away from our point, but you would agree that in tubercle of the lungs a bacteriological examination is a very important part of diagnosis; it is, is it not?—Yes, certainly.

42. Do you think it important that the means of diagnosis should be made more ready to the hand of the general practitioner? It is partly a matter of responsibility, is it not—where the responsibility lies?—Yes, but unfortunately it would not be easy to make the diagnosis of glanders anything like so certain in the hands of a general practitioner as the diagnosis of tuberculosis.

43. Not if he had access to your Department, for instance, or a branch of your Department?—Yes. The difficulty arises from the fact that the bacillus itself has no characters by which it can be recognised in a mere stained preparation for instance—it involves culture and frequently experimental inoculation also.

44. I think I must not take you any further on that subject; I thought I would just go so far as that. It is propagated both by inhalation and inoculation, I gather from you; is that so?—No, I believe there is no conclusive evidence that the disease is ever contracted by inhalation.

45. Not even from the spray of the nostrils?—No.

46. (Mr. Cunynghame.) This is a very rare disease?—In horses?

47. Glanders—in man?—In man, yes, a comparatively rare disease.

48. There are four cases a year?—There are four recognised cases.

49. Fatal cases?—Yes.

50. And there are no cases except fatal ones apparently, or at least it is exceedingly rare?—No; about that we do not possess any positive information, but I said that in my opinion it was not at all unlikely that there were milder cases that passed unrecognised, and that there are also a considerable number of fatal cases that pass undiagnosed.

51. How many people are there employed in Great Britain who could be considered as employed under the Workmen's Compensation Act, employed by an employer for the purposes of his trade, who would have the right to a compensation of this character?—You mean who would be exposed to the risk of contracting glanders?

52. Yes, who would have the right to compensation in respect of that disease?—That I am not able to answer except in this way—that glanders is an exceedingly common disease in London; London furnishes about 75 per cent. of all the cases of equine glanders.

53. You mean glanders among horses is very common?—Yes. London and the Home Counties furnish, I think, about 90 per cent. of all the cases.

54. How many grooms are employed in the whole kingdom?—I was going to indicate what the distribution of glanders is in London among horses. It is a comparatively rare disease in private stables—stables which number only a few carriage horses, for instance, stables of private gentlemen who keep carriage horses and hacks, and so on.

55. What I want to get, roughly, is—(if you cannot give it we can get it from the Registrar-General's returns)—how many grooms are there in the whole United Kingdom. You have four cases a year—how many grooms would there be to distribute those among?—I possess no information upon that, but I was going to indicate that practically all the grooms and those that work horses in all the large stables in London—all cab stables, for instance, practically all the large stables of public carriers, the studs of the large railway companies—all these are permanently infected with glanders.

56. The horses?—Yes.

57. But I am dealing not with the horses, I am dealing with the men. It is the men I want you to come to?—The only idea I can give you as to the number of men is by stating what the number of horses is.

58. If you cannot give us the number, we must try to get at the number in some other way?—Yes.

59. At all events, the four men out of the thousands

and thousands of grooms employed through the country—make a very small proportion, do not they?—Oh, yes. *Sir J. Macfadyen, M.B.*

60. The disease is generally fatal, and therefore I suppose on an average they would get about £120 a year as compensation, would not they? I will put it to you in this way. The whole compensation payable to this class of men would not be above £500 a year for the whole country, would it?—I have no opinion at all on the question of compensation.

61. If a small man—a small grocer, or somebody of that sort—had a horse, and a man to attend upon it, he would have to insure, would not he, against this disease, otherwise he might be hit rather heavily if his horse-keeper got taken by it?—Presumably.

62. Now, if everybody had to insure, the amount insured would be exceedingly small, would it not—a few pence would cover it?—Upon that question I have really no opinion.

63. Again, the mere expense of filling up the forms and going to the insurance office would be probably greater than the amount he would actually have to pay as his quota towards insuring the amount payable to the man, would not it?—Yes.

64. Looking at all these points of view, is it really worth while, with four cases in this kingdom, to create the machinery which would be necessary to protect all the small grocers, and, if it is to go to donkeys, all the costermongers and everybody affected by this through the whole country? Is it worth while to do that?—I really could not say; much would depend, of course, upon the expense of the machinery.

65. Quite so. You are talking very candidly. That is the difficulty that strikes one; it seems to be so very small a matter, and the machinery that would have to be created for it so large?—Yes.

66. I will put it in this way. As to the latent cases of glanders that have been suggested, do you think that if this disease were taken up and scheduled, more cases of glanders would come to light than actually do come to light?—Scheduled as a human disease?

67. Yes, scheduled as a human disease. I am speaking entirely of the human disease in speaking of glanders?—No, I do not think that many more cases would come to light, because, as I have said, it being a comparatively rare disease, it can seldom be observed by general practitioners; 99 per cent. of them can never have seen a case, when they meet one in practice.

68. (Chairman.) Am I right in thinking that, in view of the fact that if it were made a disease for which compensation would be payable, there would be a strong financial inducement to persons who might possibly be suffering from glanders to ascertain with certainty whether they were or not, and that in that way it might be found that there were many more cases than had previously been supposed to exist?—I think that is quite possible. It would tend to sharpen diagnosis, no doubt.

69. (Mr. Cunynghame.) And yet that diagnosis would be very difficult, would it not, before they were dead—if they were not dead?—No, in most cases a diagnosis can be made most readily before they are dead.

70. If the man is merely ill?—When he is ill.

71. (Professor Allbutt.) By a skilled observer?—Yes, by a bacteriologist.

72. (Dr. Legge.) Do you think that clinical symptoms alone would justify the diagnosis without a bacteriological examination?—Well, I do not know exactly what is meant by "justify" it, but it is quite certain that if one based a diagnosis on that only there would be a considerable proportion of errors.

73. Is the bacillus more readily recognised and obtainable from the discharge than, for instance, the anthrax bacillus?—No. It is much more difficult to make a diagnosis in glanders.

74. Generally in anthrax I would say that the clinical symptoms were so definite and pronounced as to make the diagnosis sufficiently certain for the purpose of saying that a person had anthrax even if there was failure to find the anthrax bacillus; and so I suggest in glanders—the presence of the symptoms without necessarily finding the bacillus would be sufficient to say that a person had glanders?—In my opinion, not. If I were the person against whom a claim was going to be brought I should very strongly object to being held responsible unless on strict bacteriological evidence; I believe the opportunity for errors is so great when the

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diagnosis is based on clinical characters alone. That I know to be the case with a considerable proportion of cases of equine glanders: I therefore believe that it is likely to be the same with men. The same view has often been put forward by experienced veterinary surgeons—that a diagnosis based on clinical characteristics is perfectly reliable. Well, I am ready to admit that when the diagnosis is made by an experienced person, a man who has seen a great many cases before, and it is based on clinical characters only, the chances of error are not very great, but they are always existent.

75. (*Chairman.*) I should just like to ask you another question. Is it your opinion that, with care and proper precautions, it would be possible to stamp out the disease of glanders in horses?—In my opinion it would be perfectly possible to stamp out glanders in horses—from Great Britain. It is not so much a question of "care"; it is almost entirely a question of money—the finding of money to compensate for the horses that would have to be slaughtered. Glanders will never be exterminated, I believe, except by what is known as "the stamping-out method," in which, when a case of glanders occurs, steps are taken to ascertain how many other horses in the same stable are already infected; and then the "already infected," although apparently healthy, horses must be dealt with.

76. You would not be prepared to say that it is really the fault of the horse owner if any of his horses have glanders?—No, it would not be right to say that it is the fault of the horse owner if his horse has glanders. I believe that most horse owners could get rid of glanders, but it would be at a very considerable sacrifice—I mean it would be expensive.

77. Cases occur, I suppose—as, for instance, with regard to cab owners—in which the disease of glanders is contracted from contact with infected sources—for instance, drinking fountains?—Some people have held that glanders is spread to a certain extent, or to a considerable extent, in that way. While not denying the possibility of infection through drinking troughs, my opinion is that it is of no practical importance—that the part which drinking troughs take in the dissemination of glanders in London is negligible.

78. Then it is your clear opinion that it would not be just to say that if the employer of a man—the man having contracted glanders—had glanders in his stables the employer was blameworthy?—No, I do not think it would be right to say that that employer was blameworthy. If I might say so, I think the question which usually arises when a groom is found to have contracted glanders, is not whether the owner was blameworthy for having had glanders in his stables, but whether he was blameworthy for having asked that groom to attend a clinically glandered horse—say, with a nasal discharge, and the presence of farcy buds on his skin, which conditions under the law are expected to suggest "farcy" to the owner. I mean, it really is the duty of an owner to suspect "glanders" when a horse has a chronic nasal discharge, or when he has eruptions (abscesses) in his skin.

79. Is it your opinion that it would be a just thing to require the owner of a glandered horse to pay compensation in case someone in his employ contracted glanders from a horse of his?—In certain circumstances, yes. I have read accounts of cases in which I think the owner was morally responsible when he had had in his possession a horse that for weeks had been displaying the outward clinical symptoms of glanders, and had not reported it, and had kept his servant attending to it without having warned him that it was a glandered horse.

80. (*Dr. Legge.*) I should like to ask you, Sir John, a question about anthrax. With reference to the method of staining that you have elaborated for distinguishing anthrax in animals do you know whether that is equally applicable in the case of man?—I know it is.

81. You know that it is?—Yes. It is equally applicable to the diagnosis of malignant pustule, but it is not applicable as a blood stain. The stain which I recommend is only of value when the bacilli are numerously present in the blood; it is of no value when they are very scarce.

82. But it might be obtained in the blood of man in internal anthrax where they were spread numerously?—No; I believe in fatal cases in man the bacilli are sometimes very sparsely present in the blood, just as in

the pig. This methylene blue stain is of no particular value in the diagnosis of such cases; but almost the finest methylene blue re-action which I have ever seen was in a case of material taken from a malignant pustule of man.

83. (*Chairman.*) How long after contact with a glandered animal would the symptoms of glanders in a human being appear?—Well, that depends a good deal upon whether the disease ever runs for a considerable period a chronic, mild course in man, as it does in the horse. About that I possess no information, but I think probably in most cases the symptoms would set in, in man, within a few weeks after infection, and, sometimes, within a week.

83*. It would not be possible for it to remain concealed for some months?—I believe not, before the symptoms disclosed themselves in man.

84. In an acute form?—Yes, the man might have been ill for some weeks before a correct diagnosis was made.

85. There is no possibility at all of a man showing symptoms of glanders for the first time a year after he had been in contact with the glandered horse?—I think it exceedingly improbable.

86. Can you tell me whether there are any other diseases, apart from anthrax and glanders, which may be contracted by human beings having the care of animals?—Yes; there are quite a number of other diseases, but few of them of a serious character. Foot-and-mouth disease, for instance, has frequently been contracted from animals, and various ringworms, and skin diseases, and so on, but these are not fatal diseases.

87. Still, they can incapacitate for a considerable period?—Oh yes.

88. Now, "foot-and-mouth disease," for instance—is that clearly distinguishable as foot-and-mouth disease contracted from animals?—Well, there again, I am afraid I must say that possibly a practitioner in the country who had never seen a case of foot-and-mouth disease in man—and that would apply, I suppose to 999 out of a thousand—such practitioner might fail to recognise that he was dealing with foot-and-mouth disease.

89. But an expert medical man could tell?—Yes. In most cases the suspicion would be suggested by the fact that there was coincidentally an outbreak of foot-and-mouth disease on a farm in the neighbourhood.

90. How serious a disease is it in man? Would it make a man ill?—It is practically never fatal. It is an acute fever, incapacitating a man for a few weeks.

91. And mange, for instance, does that occur in human beings?—Yes, but rarely. There are some ranges of the lower animals—of the dog, for instance—that can be transmitted to human beings; but such cases are very rare. I think they are of no importance.

92. It would practically never arise from a man's employment?—No, I believe not.

93. (*Professor Allbutt.*) I suppose that tubercle practically is not carried in the course of employment from animals to man?—We know no positive evidence proving that, but owing to the long period of incubation in cases of tuberculosis one can see that it might be difficult to prove this fact if it occurs.

94. I take it from you that glanders among horses is very infectious; it has spread to a vast extent over the country?—No, it has not "spread to a vast extent over the country." Glanders outside of London and the home counties and one or two large towns, notably Birmingham, Liverpool, Manchester, and Glasgow, is a very rare disease.

95. Then it is not a highly infectious disease even among horses?—No, it is not a highly infectious disease.

96. (*Chairman.*) What is the disease called "duke"?—I have never heard of it.

97. It appears in a letter addressed to us by the London Carmen's Trade Union. Are there any other diseases which your experience suggests to you as proper subjects for inquiry by this Committee?—No, I do not recollect any at the moment.

98. Foot-and-mouth disease is not nearly so important as glanders, for instance?—It is almost devoid of importance, because we have no foot-and-mouth disease in Great Britain at the present time, and we are not

likely, I hope, ever to have serious visitations of foot-and-mouth disease again.

99. (*Mr. Cunynghame.*) There are no others, like consumption, or something of that sort, are there? You have got through glanders and those diseases that are mentioned, all that a man is likely to catch from a

horse, or are there others on a rather larger scale?—No, there are certainly none on a larger scale. *Sir J. Macfadyen, M.B.*

100. (*Chairman.*) Nor diseases that can be contracted from the care of cattle?—No, I believe there are none of importance except those I have mentioned, and they are not important. *26 Oct. 1906.*

Mr. SAMUEL MARCH called in and examined.

101. (*Chairman.*) You are an official of the London Carmen's Trade Union?—General Secretary, Sir.

102. Does your union include a large body of men?—Well, at present we are 6,000 strong.

103. And you are anxious that the disease of glanders should be scheduled in the Workmen's Compensation Act?—If possible, Sir.

104. As a subject of compensation?—Yes, Sir.

105. Have you been engaged in the carmen's trade yourself for many years?—Forty years, Sir.

106. And have you in that time had many cases of men who have suffered from glanders under your notice?—Not a large number come before my direct notice. I have known several to come before my direct notice, but I have heard from our own members who are at work in other parts of London that they have known of cases.

107. Have they all been fatal cases, or have some recovered?—I do not know of one that has recovered, Sir.

108. Do you think that the cases of glanders which appear in the annual returns as ascertained cases of glanders are a complete list?—I should say so, probably; there may be here and there a case where it was not necessary to have an inquiry, where perhaps a doctor had been attending the patient and no inquiry would be held; but still I should say that you would get it from the Registrar when he gives a certificate of death.

109. About how many cases have you heard of, say, within the last two or three years—in round numbers?—There have been only four that we know of in our organisation during the last three years.

110. And were those cases certified as glanders by the medical men in attendance on the patients?—Yes, Sir.

111. You never hear of a case in which a man feels convinced that he has got glanders, but that the doctor is doubtful about it?—Well, of course, it takes some time to diagnose that it is glanders. The men are sometimes treated for yellow jaundice, and it turns out to be glanders in the end. Sometimes the doctors that they go to do not know what it is. Unfortunately, this arises amongst horsekeepers, who are very badly paid—more so than it does amongst carmen, and they have to run to the cheapest doctor they can get, and those doctors are not always able to diagnose the case as being a case of glanders, and they treat the men for yellow jaundice for a time until it develops; then, of course, they are probably sent off to a hospital—isolated—and then they find out the true facts of what the disease is.

112. Have you ever known of a case of glanders contracted from some other animal than a horse—a donkey, for instance?—No, Sir, I have not.

113. (*Mr. Cunynghame.*) I have not quite understood the position. Your carmen are van drivers, I suppose, are they?—Yes.

114. Do you employ these horse assistants? Do the car drivers employ these men, or who employs them?—They are generally employed by the employer who owns the horses and vans.

115. There is in London, is not there, a considerable employment of men who look after horses by the cabmen themselves—the drivers—is that so?—Not a great number, Sir.

116. It would be very easy, would it not, to get compensation in the case of the members of your Society, or in any case where it is a well-marked society, but it would be rather a formidable thing, would it not, to bring that in for so very few cases through the whole country, and make it apply to every small grocer and costermonger who employed a man of any kind?—We consider that even although there are only a small number of cases, the widow and children certainly are entitled to something.

117. I do not dispute that proposition. The only question is the difficulty of bringing it in. I want to put that before you. Suppose you have a man using horses in a small way of business, and employing a man, he would have to insure the man, would not he?—I should say so, Sir.

118. (*Dr. Legge.*) What is the number of members that you have in your union?—We are a little over 6,000 strong just now, Sir; that is including carmen and horsekeepers; the majority of them are carmen.

119. And amongst those you have had three cases in the last three years?—Four cases during the last three years.

120. Can you state the actual number of cases of glanders you have heard of amongst others who are not members of your society?—No, Sir, I have not any actual statistics.

121. Have you heard of others?—I have heard of others.

122. In London?—In London. I have heard of those through the members of the executive, but I have not any definite cases.

123. In the case of these four, do you remember what was done for the widow and children?—Only that—the husband being a member of our society—we paid out the funeral claim; and that is how it is that we get to know the cases that come before our notice, because we have to pay out the funeral claim; and then, of course, after that the society formulate a committee, and probably get up a little benefit. That is what we did in one of these cases that I am thinking of. In the last one the widow was left with six little children, and we were not able to get anything from the employer at all for the widow and children, and eventually the widow either has to turn her hand to do some kind of work, or else throw herself on the rates—the parish.

124. In that particular case was the employer a large employer?—Fairly—a fairly large employer.

125. (*Chairman.*) In the letter which you have written to the Home Office on the subject you mention the disease of "mange or duke"?—Yes, Sir, there are two other diseases that the men take, such as farcy and mange.

126. Is not farcy the same as glanders?—No, Sir; farcy usually comes out in the legs. That is generally caused through neglect or the man not having proper time to get the horse clean, or through its standing in filth. It is generally a conglomeration of boils. I could not describe it anything nearer.

127. It is quite a different disease from glanders, is it?—Quite a different disease.

128. It is a disease that never comes from glandered horses?—No, Sir, we have more cases of farcy and mange than we do of glanders in horses.

129. In horses?—Yes, Sir.

130. "Farcy" is described by the Board of Agriculture as being the same disease as glanders?—Oh, indeed!

131. Among horses?—We do not take it so, as carmen working amongst them.

132. Would a doctor describe this disease in the legs of a human being as "farcy"?—We would not get the disease in the legs of human beings, Sir.

133. I understood you to say you did?—No; we get it from the legs of the horses—this farcy.

134. (*Professor Allbutt.*) Is it what is generally called "grease"?—Yes, it is usually called "grease" in the common phrase, but I believe the medical phrase is "farcy."

135. I think it is more colloquial; I do not know that in medical writings it would have that name, but it might colloquially?—Yes, Sir, probably so. The men working with them, when they begin to discharge—if they have the least little scratch or bad place on their

Mr. S. March. hand they contract blood poisoning from that mostly, the same as they do from mange. Mange is a sort of skin disease.

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(*Chairman.*) Now as to this disease of "grease" or "farcy," or whatever it may be called, how precisely does that occur—how does it arise?

136. (*Professor Allbutt.*) This is not "duke"?—No, they do not mention it as "duke" in the books; they call it "mange."

137. (*Chairman.*) Putting aside "duke" or "mange," let us return to "farcy" or "grease." What are the symptoms of it?—The symptoms of it, as I have stated, are through neglect in keeping the horses clean. Probably neglect through the horse not being continually or properly doctored, or through standing in a good deal of rubbish or manure in the stable, brings it about.

138. Brings it about in the horses?—Brings it about in the horses, and then of course it forms a large number of boils, which get conglomerated together most like a large bunch of grapes; they gradually break, and the discharge from them gets on to the man and causes him to take blood poisoning.

139. Is it a kind of blood poisoning that can be distinguished from other kinds of blood poisoning?—I do not think so, Sir.

140. Does it occur frequently?—No, not very frequently.

141. About how many cases come to your knowledge in a year?—I should not say more than about two or three.

142. Then would all cases, in your opinion, of this illness come to your knowledge?—Oh, yes; in cases of that kind we pay "accident" benefit, and we should describe that as an accident contracted from a horse while the man is at his work.

143. How could you ascertain whether it came from the horse or whether he had got blood poisoning through cutting his finger at home?—Only by his own statement to the doctor. The doctor gives him a certificate as "blood poisoning."

144. There is no symptom in the disease itself which distinguishes it as having been contracted from a horse?—Not that I am aware of.

145. And is it a serious complaint; is it ever fatal?—I do not know of any fatal case, but I have known some very serious cases of men being laid up for a considerable time through it when they have let themselves go for some little time thinking they were going to clear themselves off; they let it get a good hold upon them.

146. But if it is treated at once it can be cured?—Oh, yes.

147. Cases, I suppose, sometimes do arise which are treated in time?—Yes; we advise our members, if they have anything of that kind, to go to a doctor at once.

148. Then do you think it would be quite fair to the employer to make him pay compensation to a man who could easily have cured himself if he had gone to a doctor?—We think the employer could prevent a good many of these diseases if he would have periodical examinations of his horses by a veterinary surgeon, and also by keeping their stalls cleaner than they do. It is only through lack of employment of men that a great deal of these complaints come about; I believe a great deal of glanders could be prevented if they would more frequently have their stalls and stables cleaned out and whitewashed—and their mangers too.

149. Now about this other disease—the "mange," or "duke"—"duke" I suppose is a slang name for it?—That is a common phrase, Sir.

150. Can that disease be clearly distinguished from other diseases?—Oh, yes.

151. What are the symptoms?—It is a skin disease—the breaking out of small pimples in the skin, causing irritation, the animal suffering from it always wanting to get against something to rub himself against, and he is very fidgety in the van or in harness; the harness upsets his skin and he begins chafing about, and in cleaning the horse the dust from the horse gets into the pores of the skin of the man, and that causes blood

poisoning and irritation, and sometimes causes the man's arm to break out in bad sores.

152. But it is not, in the human being, a disease that is different from all other diseases?—Oh, no; it is usually contracted from the horse.

153. If the man went to a doctor and said, "I have got these symptoms, and they are due to my employment," it would not be possible for the doctor to say without evidence whether they were due to a disease arising from the employment or not?—I do not suppose he would be able to unless he had happened to see the man before he contracted that disease.

154. Is that a serious complaint?—Not so very serious.

155. The man recovered?—Yes.

156. Always?—Well, most always; I do not know of a fatal case.

157. About how many cases come to your notice of this disease?—About three or four a year; it is very similar to farcy.

158. (*Mr. Cunynghame.*) I should just like to ask one more question. I suppose that some of the members of your Union are drivers and some of them stable minders—is that so?—Yes, Sir.

159. Do the drivers tend the horses much and wash them, or do they mainly drive?—They mainly drive.

160. And the stablemen make it their business all day to be looking after the horses?—The stablemen look after the horses in the early morning and turn them out, and then look after the stables, cut chaff, and prepare for the horses coming in at night.

161. The disease of glanders would be chiefly caught by these stablemen, I suppose?—Yes, Sir.

162. So that it is the stablemen you really want to protect, and you would be content if you could get this provision even with the limitation of it to a man who was regularly carrying on the work of stableman during the day; if he were protected that would probably satisfy you?—Well, of course, it is more dangerous to the stableman, and it is more frequent among the stablemen, but the carmen are liable to contract it by taking the horses out.

163. I presume you do not wish necessarily to involve in this "accident" everybody who drives a horse all over the country, and I am suggesting that it might perhaps be enough if you confined it to the class of men who are regularly employed and engaged in cleaning stables and horses?—Yes, I understand your question, Sir, but of course there are a number of firms where the carman does the stable work himself as well.

164. Is it a large number or not?—Not a large number. Of course the largest number do not have the carmen cleaning the horses and doing stable work, but there are a number who do.

165. But it is, as you have just told us, the men who work the whole of their day in attending to the horses and cleaning the stables that are the most liable to this disease, and that you wish to protect?—Yes, Sir, that is so.

166. (*Dr. Legge.*) In this disease—"mange" or "duke"—which you speak of, if the places are covered up are the men able to go on working?—No, Sir, the pain is too great. It usually opens the skin, and you must really open the skin to get the disease out, because it poisons the blood.

167. Do you recollect the length of time that these men were laid up?—About three or four weeks at the outside.

168. In these three or four cases that you speak of?—Yes.

169. You were referring to the way they allow the symptoms to go on, but suppose they were to be treated at once?—I dare say it could be cleared out in a week.

170. Could not they go to work with it covered up?—It would be rather dangerous if they did, because in their work they cannot cover themselves up very much with a coat. I have known a man pull the leg off a stocking, put that over his arm, and go on working with that; but the dust is likely to get through it.

171. What result has that had?—A very good result, but the dust is likely to get through, or would be if he went to work amongst that class of horses again.

SECOND DAY.

Thursday, 1st November 1906.

PRESENT:

Mr. HENRY CUNYNGHAME, C.B.
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.
Mr. T. E. BETTANY (*Acting Secretary*).

Mr. I. SINGER called and examined.

172. (*Chairman.*) You represent the Bradford Dyers Association, Ltd.?—Yes, I am the Chief Chemist of the Bradford Dyers' Association.

173. That Association comprises firms not only in Bradford but elsewhere in the country?—Bradford and Lancashire chiefly.

174. About how many associations are there in the undertaking?—About thirty-seven distinct factories.

175. And what proportion is that thirty-seven of the factories of the kind in this part of the world? Is it nearly all?—It is not all. I could not answer that question. Our Secretary, I daresay, would be happy to supply any such information.

176. Do the firms in that Association, so far as you know, pretty well represent the different branches of the trade?—Oh, yes, of the piece dyeing trade.

177. The other dyeing, such as the dyeing of the finished article?—That is the finished article, what we call piece dyeing, the woven pieces. These are technical terms, of course—in contradistinction to the dyeing of yarn or loose wool.

178. Now, Mr. Singer, we want to know something about anilin dyeing, and I will take them in order. I had better separate one from the other?—Yes.

179. (*Professor Allbutt.*) Shall we hear any evidence about the yarn dyeing?—We have one branch where we are yarn dyers, one only. It is a minor affair with us.

180. (*Chairman.*) We will first ask you, at all events, about piece dyeing, and then see whether there are any particular points about yarn dyeing. And first of all we will take the dyeing with chrome?—Perhaps I had better point out here a distinction. Do you mean chrome dyeing or simply dyeing where chrome is employed.

181. Where chrome is employed?—Because there are articles which are dyed with chrome, chrome yellows, which is a distinct trade.

182. You have nothing to do with that?—Nothing at all. That is with chromate of lead colours. When I say nothing at all, I should like to qualify it—at present we are not dyeing any; it is not saying that we may not at some future time.

183. I think you had better begin by giving us just an idea as if to people who know nothing about it. What use is made of chrome in the operations of dyeing that you are going to tell us about?—The chief use in dyeing generally, apart from anilin fast black dyeing, is as a mordant, to prepare the woollen material so that it may take the colour. I hope I may speak elementarily?

184. Certainly; we know nothing of dyeing. Of course, we have a distinguished professor here who will follow your scientific explanations. What is a mordant?—We classify colouring matters into substantive and adjective dyes. We may dip the material into a solution of a substantive colouring matter, and take it out dyed. If we dip the same with an adjective dye, the material would not be dyed, hence we have to prepare it by fixing on it certain substances, usually metals, which we call mordants. In woollen dyeing, this mordant is chiefly chrome. The loose wool yarn or pieces are boiled in a solution of bichromate of soda or bichromate of potash, and then the goods are boiled in the dye solution. In anilin black dyeing, the colouring matter is put on first, and the goods are passed after-

wards through a chrome bath to oxidise the colouring matter. The two processes are not analogous. *Mr. I. Singer*

185. Is that bichromate of soda, or potash?—*1 Nov. 1906.*
Generally bichromate of soda, because it is cheaper.

186. Then we may say that with regard to chrome used as a mordant it is bichromate of potash and soda that we have to reckon with?—Yes, exclusively.

187. And there is no other substantial use of chrome that we need trouble ourselves with?—Not that you need trouble yourselves with.

188. Therefore our problem is this—what dangers are presented by the dipping of wool into bichromates of potash and soda?—Yes.

189. Now, will you please tell us what are the effects of the use of bichromate of potash and soda on the health of the workman?—I think that ought to be answered by medical men rather.

190. I do not mean in the physiological sense—do not look at it from the medical side.—I myself, for instance, and let us say 80 or 90 per cent. of mankind, can handle chrome with impunity, just as you might handle sulphate of iron or any other salt; but there are some individuals on whom it seems to have an effect, causing certain eruptions which, no doubt, Dr. Legge will define in medical terms. I do not know which term I should use, whether I should say that there is a predisposition in the individual or whether it is idiosyncratic, but the fact remains that most people can handle chrome with impunity. I would dip my hands in the bichromate solution, and Alderman Hayhurst, who is the secretary of the Operative Dyers' Association, says he has used it for years and years with impunity.

191. How strong a solution?—The strongest that is ever used would be a 5 per cent. solution. None is ever used stronger—as a matter of fact always weaker.

192. The 5 per cent. solution colours your hand?—Of course, the liquid is coloured, but it leaves no colour on the hand.

193. You can handle this 5 per cent. solution with perfect impunity?—The crystals themselves, or saturated solutions, with the greatest impunity.

194. You mean that is the case with the majority?—The vast majority.

195. The vast majority of human beings can handle any amount of bi-chromate solution with perfect impunity?—That is so.

196. And with no injury either to the skin or the general health?—Absolutely no injury. It is not corrosive. It is only where there is a predisposition that there are these little pustules formed.

197. In the case of people who have this predisposition, how soon do the effects that you have described begin?—The cases that have come under my personal observation generally started with a cut or some opening wound. We have one case now at Craven Pearson and Co.'s. He is at work. He has a tied up finger. It may be due to chrome or something else.

198. If you had a cut on your finger, one that bled, and put bichromate on it, it might smart?—I doubt whether it would smart. In any case I have handled it for years. I have been now since 1888 research chemist on anilin black, and I have made extensive experiments, and always used my hands freely, without paying particular attention to a cut.

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199. Can you tell us from your memory what is the shortest time that you recollect in which a person being employed in handling chrome solution has developed these eruptions?—It may be months or it may be years.

200. Before it would begin to appear?—Oh, I should not care to say that, I mean before it may become serious. I have really no knowledge how soon the first symptoms appear. There is no such thing as a sudden case of poisoning or alarm, and the man who is affected by it will keep on working for months or perhaps years before he will take medical advice. I think I am correct in saying that?

201. We are not expecting absolute accuracy in the medical part. When this poison begins to take effect what are the worst symptoms you have seen?—Pustules and a few pimples.

202. Has a man been obliged to take to his bed from headaches?—Not so far as I know. He will keep on working—in fact, some men who have chrome poisoning are covered all over the arms, and keep on working for years.

203. All their lives?—Well for years. I should say yes.

204. Excepting for an inconvenience, according to you, the harm done is infinitesimal?—Whether ultimately it does harm or not, I should not care to answer that question.

205. Now I will take the next point—are there any precautions in the use of bichromate which a working man ought to take?—I cannot think of any. For this reason: He might shovel the bichromate crystals into the dissolving tank without ever touching a crystal. No dust is given off there. In most of our factories we have made arrangements to supply the chromate in solution.

206. Why do they do that? I should have thought it was easier to supply it in crystal?—We prefer to do it in solution. It saves handling and labour.

207. It saves the labour?—We prepare, say, a thousand gallons—and then we give so many quarts or so many gallons to each man for his machine.

208. You do not represent that it is any safer to handle when ready dissolved than when crystallized?—Absolutely not.

209. There is no particular precaution then that has to be taken in the shovelling of the dry material?—No; my contention is that if a man was liable to get this chrome poisoning, nothing will protect him except keeping him away entirely, because it is very difficult to be in a place where you have always an article present and to say that you do not touch it. Theoretically, he need not touch it, either in solution or in the crystals, but it is impossible for a man to handle a thing impregnated with a substance and not come in contact with it.

210. (Professor Albutt.) He need not handle the pieces at all?—He need not theoretically. It is possible not to handle them, but really it is hypothetically only; he is bound to handle them.

211. (Chairman.) A man engaged in the process of mordanting goods with bichromates is sure to get some solution on to his hands?—Accidentally.

212. One way or the other?—As a matter of fact, supposing the goods curl at the edges, it is most natural to put his finger or thumb in to straighten them.

213. There are no doubt other things analogous to that. As to the shovelling, is there anything else that might be done—would it be possible to put gloves on?—It would not be practicable.

214. Would not they prefer to put gloves on?—We are willing to supply them.

215. Have you offered to do so?—Oh, yes.

216. What are the sort of gloves that you have suggested?—Indiarubber gloves.

217. Up to the elbow?—Of course, we would supply them any shape or size. The men would object.

218. I am asking just what you have suggested?—They were indiarubber gloves that would reach to about here (indicating the wrist).

219. Now, I want to ask if those indiarubber gloves were worn all day would not they be unpleasant and even deleterious on account of not letting the perspiration out?—That is so.

220. Is there anything in the way of ventilation that would be a good thing? Are there no fumes that arise?—None.

221. From this solution?—None, bichromate is absolutely non-volatile.

222. Is it used hot or cold?—Both hot and cold.

223. Then you do not seem to be of opinion that this chrome process is very deleterious?—Absolutely not.

224. Then I should like to go on to anilin. Now just tell us very briefly how the anilin is used in dyeing. Is there one process common to all the trade? Just briefly describe it?—Anilin oil is combined with the hydrochloric acid in an aqueous solution whereby we convert it into its salt. This is mixed with copper or chlorate or other salts, according to the individual preferences, and with that the goods are impregnated in the cold. These prepared goods are passed through a heating chamber which we call the ager.

225. The thing which gives an age?—To age the goods.

226. So called from its being employed to age?—In the early days we used to hang the goods for several days; now that is performed within a few minutes, and hence the name ager.

227. (Professor Albutt.) That is the black anilin dye?—The anilin.

228. The material goes into the ager?—Here the chloride and anilin react with each other, and fumes are given off, chiefly of chloric and hydrochloric acid. Of course there are some vapours of anilin with it, but as far as the nose can detect, these are chiefly chloric and hydrochloric acids. The goods come in a green state out of this ager. Then they are passed through a solution of bichromate, and that is practically all.

229. And then they are dried?—They are rinsed and dried.

230. So that you have these processes, roughly speaking. First there is the mixing, then there is the dipping, then there is the ageing, then there is the bichroming?—The chroming.

231. And eventually the cleansing and drying?—Yes.

232-3. Speaking broadly, those may be said to be the five processes that you go through in anilin dyeing. Now we had better take them one after the other and see what dangers, if any, exist in each of them. Now take the first—in mixing the anilin oil with hydrochloric acid?—Hydrochloric acid and water.

234. What effects are found on the men?—None.

235. But they handle hydrochloric acid and anilin?—Yes, but of all cases of poisoning, due to the operation itself, we have none. I know an old man, perhaps 60 or 70 years old, who has been in the mixing department, to my own knowledge, since 1888. He had been there before then. This man had been poisoned on two occasions, but in each case the poisoning was due to an accident. The spigot of a 1,000 gallon tank, containing anilin solution, came out, and the man swallowed some of the anilin. We gave him raw egg and milk, and he was soon brought round, but from the actual mixing itself he suffered no ill effects.

236. You do not know, at all events, of any disease happening from the operation of mixing the oil with the acids?—No; by which I will not say that people might not get poisoned if the place was not ventilated, or if they stopped there longer than is necessary.

237. What are these fumes, are they of anilin or hydrochloric acid?—Of both. If hydrochloric acid and anilin are brought near each other, the fumes that are given off, combine, and produce those white clouds analogous to what is produced when ammonia and hydrochloric acid are brought near each other.

238. You now speak of those substances giving off the fumes in the cold?—Yes; anilin oil and hydrochloric acid brought near each other give the characteristic ammonia fumes.

239-40. The anilin oil of itself gives no vapour?—Not visibly; but in the mixing we get the characteristic ammonia fumes.

241. (Chairman.) And the rooms in which that is done ought to be ventilated?—They are. In our case they are.

242. In your factory?—Everywhere, in all our factories.

243. At all events they ought to be. If they are not men might get poisoned?—If they stopped in long enough.

244. Now take the dipping, the dipping in the mixed solution.

245. (*Dr. Legge.*) You spoke just now of the characteristic ammonia-like fumes; are those the fumes of anilin hydrochloride?—Yes. If I bring two bottles together, one of anilin oil and the other of hydrochloric acid, we at once get those dense fumes. What really happens is that the vapours of anilin oil and of the hydrochloric acid combine to form a salt, salt of anilin.

246. (*Professor Albutt.*) In what sort of vessel is that done?—Chiefly in square tanks holding anything between 400 and 1,000 gallons. We introduce first the requisite quantity of water, then the acid, and finally the anilin oil is pumped up. That can be pumped up from the outside, so that no man need be inside the mixing-room until all those fumes have cleared away.

247. (*Chairman.*) And that salt of anilin is poisonous?—I would sooner Dr. Legge answered that question. What I mean is this: In anilin oil factories the regulations are that if any man gets any anilin on his hands he has to wash them at once with acidulated water, thereby converting it into a soluble salt. In our case it is already a salt. How far that modifies the physiological effect of the anilin I do not know.

(*Chairman.*) It arises in the mixing.

248. (*Professor Albutt.*) The mixing, I understand, requires no direct human agency?—Not necessarily. We try to dispense with it entirely.

249. (*Chairman.*) I suppose in the mixing the men do occasionally get some anilin oil on their hands?—If careless, they might. But it is not serious if a man washes his hands.

250. Now we take the process of dipping the piece goods into these vats; well now, what injuries to the men are likely to happen from that?—I do not know that there are any. I deny that that is in any way injurious.

251. Do they get pustules on the hands?—No. The effects of anilin would not be the same. They are quite different from chrome poisoning.

252. Do they breathe any vapours that are deleterious during the dipping process?—No; there are no vapours given off.

253. Is that admitted? I want to put that point to you—you find difficulty in believing that in dipping there can be any deleterious effects?—I have read Dr. Legge's report on that, and, whilst I would not be prepared to controvert every item—formerly the anilin dye works were not in a perfect condition, and these effects no doubt were noticed—what I deny is that any man by preparing goods with 5 per cent. or 6 per cent. anilin salt solution could possibly have any ill effects. As Dr. Legge points out, there might have been formerly, when most of the mixing was done in the dye-house itself. All that is separate now, and under present conditions of working that is impossible.

254. Is it not a fact that men are sometimes employed in mixing and sometimes in dipping—the same men?—I do not think so. In our principal works I know for certain that the mixers are engaged for that specially, and they do nothing else.

255. In the smaller works?—It is possible that they are.

256. But not in mixing?—I do not think so. The preparer would always be the same man. Possibly they might do something else in the storeroom. I can ascertain that if it is of interest. They are always engaged as mixers. The fumes they would not be exposed to at all.

257. What proportion of their time would be spent, with a man who was in the mixing-room all day, in the fumes and in the other operations of filling the vats?—He would not be in the mixing-room while he puts in the anilin oil. As a matter of fact, the most disagreeable part of the whole thing is when the men are emptying carboys of hydrochloric acid.

258. What I wanted to get at was this: Whether the persons engaged as mixers—although they are, of course, known as mixers—how long they are subject

to the actual fusion of mixing or the fumes?—They would not be subjected to it at all. The point is this: The man puts in the water and the acid; then he can go outside, and send up the anilin oil through the pump, and while the fumes are in the room he has no reason to be inside—no business.

259. (*Professor Albutt.*) It would be contributory negligence if he is there at all?—Yes. And if the Committee desire to see some of our factories we shall be very happy to show them.

260. Is there any exhaust from these vats?—They would not be of any use, as the fumes are heavy. The windows are open, and there are large openings in the bottom of the wall to get rid of the fumes.

261. (*Chairman.*) These are trades which it seems to me would be benefited by some special rules, would they not?—I do not think so.

262. To prevent people being imprudent?—I do not think there is any ill-effect on the mixers themselves.

263. They ought to be forbidden to remain in the room whilst the process of the fusion of these two substances is proceeding. Now, with regard to ageing, are there any dangers in that process?—I myself can see none. I should not like to give evidence that might look *ex parte* evidence. What I mean is this: I cannot say that the fumes that are given off in the ager ought to be inhaled. They should not, but the men are not inside the ager.

264. And they ought not to be?—They are not. As a matter of fact, in some agers they could not be. They would be ground to pieces. There is no possibility of them getting in.

265. Then how do the goods get into the ager?—Automatically, in a way which I think you should have an opportunity of seeing. They are sent in, and they come out again.

266. Are not there some factories where the goods are simply put into the ager by hand?—Not in our association, and I doubt whether there are really in any case. Such a process would not pay.

267. (*Professor Albutt.*) Mr. Singer, you told us that if a man got the anilin oil on his hand, he should proceed to wash it off at once with acidulated water—why?—Because it has ill-effects if long on the skin.

268. (*Dr. Legge.*) And might not that account for the men at the preparing showing some slight symptoms?—I do not think so, because there the anilin is already in the form of salt—and I am attributing these effects to the base itself, and not to the salt.

269. (*Professor Albutt.*) I quite understand, but if the anilin oil did remain on the hands beyond a very short time it would produce some effect on the skin injurious?—Not on the skin. It is said to be absorbed by the system, just as if taken internally.

270. That is more important still. Your point is that such accidents do not occur?—They have not much chance of interfering with the anilin oil; as a matter of fact the mixer is the only person to handle it.

271. (*Chairman.*) I will pass to the cold bichromate generally. May I say I am correct in thinking that the cold bichromate process is very much like the mordanting process?—They are very much the same.

272. The same remarks apply?—Yes, simply the handling of chrome.

273. Would it apply to one case as to the other?—Yes.

274. And now the last process of cleansing and drying, is there any particular danger there?—Absolutely none.

275. But, then, if it is the case that these operations are really not dangerous, how is it that a certain amount of disease or injury has occurred in these trades?—We do not admit it, sir.

276. That is what I want to come to, but unquestionably men have been found who are ill?—Yes, many cases.

277-8. How do you account for the belief that undoubtedly obtains, not only among the men, but also among others, that this is an injurious trade?—I think I can give a complete answer to that. I have been experimenting myself in one of our factories with an organic salt copper, which, under the conditions of the experiment, gave off much copper-dust. My

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Mr. I. Singer. assistant called my attention to the fact, and I stopped the experiment at once.

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279. Why did you stop at once?—Because the men were seriously molested by the copper-dust, which they thought was anilin; yet neither anilin nor chrome had anything to do with it. Had it not been for this experiment, I doubt whether we should have heard so much about green dust. This is one case. The other relates to chrome poisoning in works where the bichromate is being manufactured. Pamphlets have been circulated about the dangerous effects of chrome in such works, and the men reading that naturally think of chrome as a dangerous poison in whatever form it may be. Here is an illustration in point. I have visited yesterday with Mr. Hayhurst, the Secretary of the Union, one of our factories, when the men pointed out to me a little deal box that was quite yellow as evidence of "chrome-fumes." Their reasoning is very simple: bichromate is yellow, and the box has turned yellow; hence the latter has been coloured by the former. As a matter of fact, however, the deal has been turned yellow by anilin, and chrome had nothing to do with it. In this way, and thanks to the crude conditions which undoubtedly obtained in the early days of the industry, anilin black dyeing got a bad reputation; in my opinion, undeservedly so, if present-day conditions are taken into account. I should like to supplement this by saying that in order to prove my contention, I have asked Mr. Hayhurst to supply me with the statistics of sickness for six months or a year, showing the number of people employed in the whole Association, and percentage on the sick list; then again the number employed in the dyeing of anilin black and percentage on the sick list, and from what causes. Unfortunately these figures were not available. We, in the Association, do not keep statistics of sickness, so I thought I might do the next best thing and take a census. I have done so, and have here the results, which I desire to submit.

280. I just wanted first to make clear to my mind about this copper poisoning. Will you please again tell us the exact process by which men get poisoned by the copper?—I had introduced, for a certain experimental purpose, an organic copper salt in the mixture. When the goods were dry and were pulled over, a dust was given off.

281. In the dry?—Yes, that was the copper really, and not anilin or chrome at all.

282. Then surely in the last process, where the goods have been subjected to anilin and copper—that is, after the ageing and bichromate in the drying—a certain amount of copper might be given off?—No; only if that particular compound were present.

283. But you may have organic acids, may you not?—That is so.

284. They do use them?—Yes.

285. It appears to me that your evidence rather tends to show that deleterious salts might come off in the last process of cleansing and drying?—I will go further—I do not try to give *ex-parte* evidence. Whenever textiles in the dry state are pulled over, some fibres are coming off—what we call dust—and in these there is, when in the green stage, always some copper salt and anilin, and that dust should not be inhaled by the men.

286. But it comes to this—that, at all events in that fifth process, it does appear that there is a danger. It may not be a very great one, but it is a danger?—That is so.

287. You have given your evidence extremely fairly, and if you are correct it would be doing the employers no harm if they were made liable to compensate persons who were poisoned by these processes?—That is a question with which I have nothing to do. I am trying to give evidence as a chemist.

288. A very fair answer. Now with regard to that census and statistics?—I could only ask how many were ill on a certain day.

289. These are the statistics of illness amongst operatives employed by the firms that are in your Association. Is that so?—Yes.

290. How many firms are there?—37.

291-293. Now will you give us your statistics?—Those on the sick list of all the operatives in our employ amount to 1.68 per cent. If we divide our

employees into those working where no anilin is used at all, and into those at works where anilin black is dyed, either partially or exclusively, the number on the sick list is 1.64 per cent. Further sub-dividing the men into those actually employed in the anilin black dyeing process, we find there are only 10 men on the sick list out of the latter, and of these not one on account of poisoning from his occupation. The analysis on these 10 men runs as follows:—One suffering from slight cold, absent one day; one absent two weeks with dropsy; two absent one day from colds; one absent one day from bad leg; one, inflammation of the bowels, absent four weeks, improving; one, cause unknown, absent one day; one absent a week with a cold; one absent three weeks sick; one suffering from sciatica.

294-295. Then in the whole of these men that are ill, there is not one single case among them of either anilin poisoning or chrome poisoning?—Yes, that is so. If I take you to one of our branches, there is one man who says he suffers from chrome poisoning. He has a bad finger. He is not absent from work either on account of chrome poisoning or anilin poisoning, and one man who complained to me, I asked him yesterday: "Shall I transfer you? I will transfer you to the singeing department." He said, "I would rather stop."

296. What are the relative wages?—He would neither gain nor lose in wages; and I hope the members of the Committee will find time to come round. If I had to pick out the places where I wanted to be employed, the mixing room or the ager would be my choice—quite a little sinecure.

297. That pretty well ends your evidence-in-chief. Is there nothing else you would like to add to what you have said?—I hardly know that I can add to what I have written.

298. At all events, I think we have covered pretty well all the points your *présis* deals with?—I should simply like to say this—all this criticism—I should not like to say anything that might injure the men. I wish them well in all their endeavours, where they are trying to get any amelioration. But as far as this outcry against anilin poisoning or chrome poisoning is concerned, it is my honest opinion that it is absolutely groundless and carping criticism.

299. (Professor Allbutt.) That is in respect of poisons from work?—In respect of the whole question of scheduling anilin or chrome.

300. I thought we were all agreed about the eczema on the hands and arms?—Of certain individuals.

301. Quite so?—Whom no Act of Parliament can protect.

302. That is true of all diseases.

303. (Chairman.) And these pustules; your view is that they may get these pustules on the arms—that does not prevent them working?—It does not; and more than that, if any man finds that he cannot stand chrome he should at once give notice and he can be employed elsewhere.

304. And then you mean the pustules would cease?—I should prefer a medical gentleman to answer that.

305. I prefer to ask you. You might have seen it?—All I know is that I have seen men that have had an arm like that for 15 or 20 years, and they have been working.

306. If they went to something else would the pustules disappear?—I should say so, but I am not competent.

307. (Professor Allbutt.) I should like to read you a note that I have taken about copper salts. Copper salts are present in all these processes, and, if inorganic salts, are not harmful except in the dust from the dry pieces?—I should not like to say that they are not harmful. They do not give off dust. A copper salt taken internally in any case would be harmful.

308. But I do not understand that there is any risk of their being taken internally?—Any dust the men would inhale.

309. That is, the dust from the dry pieces—that may be harmful?—If present as a certain organic salt. I should prefer it differently worded.

310. I should like to have it down exactly as you would put it?—If certain organic salts of copper are employed the dry goods are liable to give off a dust

containing this copper, which, if inhaled, is harmful, but in the absence of such salts no such dust is produced. That is to say, the goods do not dust when the dry goods are handled.

311. Then there is something in certain organic salts which makes the fibre give?—It does not combine with the fibre. I might strike it like this and get dust off. Ordinarily no dust of copper is given off.

312. No dust?—Yes, dust of a kind, but we are wearing those fibres on our body.

313. Then I have a note to the effect that those organic salts of copper are not in use, and where used are only in some experimental dyeing which occupied one day only?—Yes, that is so.

314. (*Dr. Legge.*) Just to take up that same point about the ferrous salts, when I visited one of the works in Bradford I noticed from the jigger where the cloth was being passed there was an exceedingly acrid dust given off; it was only in that one department?—Yes.

315. And it was suggested to me that the acrid nature of the dust was due to copper sulphate?—I should say that was a mistake.

316. The dust was there?—It may have been copper.

317. Copper of some sort?—Yes.

318. But it was suggested to me that it was not bichromate irritating the nostrils, but it was the copper salt?—It could not have been there.

319. On the day of that one experiment?—And you have not seen it either. I will explain what you have seen. When the goods come out of the ager they are in the green or emeraldine stage. It is then that the dust is given off, and the dust consists of a fibre of cotton or the nap of the cotton, and that, of course, is green just like the cloth itself. If you analyse that, a copper salt; but that copper salt is present in that fibre also when the goods are finished and we are wearing them. There is copper and chrome in this here. (*Pointing to his coat.*) So it is simply a question of these fibres; the inhalation of the fibres themselves would not be healthy even in the grey room. In the singeing house far more is given off than in the dyed state. This is the point I should like to bring before this Committee. There are portions of the dyehouses that are far more disagreeable and more injurious to health than the anilin black, and if anilin black should be singled out as a dangerous trade, then you would have to proscribe the whole dyeing industry.

320. But the inhalation of singed dust or cotton fibre would not produce an acute irritation of the inside of the nose, with prolonged discharge going on for several hours after leaving the factory. Nor would it lead to ulceration of the nose?—These effects are not produced normally, and can refer only to the experiment as before explained.

321. Is hydrocyanic acid developed?—In the prussiate black.

322. Do you consider the inhalation of these fumes distinctly injurious?—A man should not be subjected to them, and there is no need for it either.

323. Is it an extensive process?—We are using it now and then.

324. Have you known of any symptoms of illness produced among the men?—No.

325. Do you take the fumes away?—The men do not go into the ager. I would undertake to stand inside that ager for three hours.

326. Where this prussiate black is worked?—Even there, although I should not care to do it; but in an ordinary ager I would stand three hours for any discomfort I should feel, except perspiring. What I contend is this: I will not try to make out that they are not injurious; but inasmuch as no man is inside that ager any more than a man is inside our flues or chimneys, the thing is quite harmless. It should not be allowed to be used in such a manner that men should be subject to inhaling the fumes.

327. If so used in such a manner, then there would be no objection to schedule it under the Act and pay compensation to the work people who suffered in consequence?—As soon as you are drifting to the legal point I would like to stand aside.

328. With regard to bichromate poisoning, do you know of any particular point on the hand or on the fingers that is particularly liable to suffer when

attacked by chrome?—No. What I have seen, you have seen. We have seen it together. *Mr. I. Singer*

329. The usual place is for it to attack the root of the nails, and if in a factory a man was seen with the marks of an ulcer at the base of his nail, there would be almost absolute certainty that that was caused by the chrome—would you agree to a statement of that sort?—I should say that is the most likely place where they would get poisoned. This is just where the chrome would keep. Unfortunately some men are not cleanly. *1 Nov. 1906.*

330. (*Professor Allbutt.*) Are you speaking just of ordinary cleanliness, or of some special rinsing?—Special rinsing of the hands. They will go home with their hands just as they have been working.

331. (*Dr. Legge.*) And you agree that an ulcer contracted at the root of the nail like that would take a long time to heal?—I know nothing of that at all.

332. So far as your Association is concerned, the question is a small one?—I should say very small indeed, as I have here the statistics. I have there the original letters. We have at present amongst 8,000 men not a single case.

333. That represents one day, but if you took the number in a year?—It is possible there might be some cases. I have tried to get these statistics from the workmen's union, and I could not get them. We have no records.

334. Have you no knowledge of any workmen employed by your Association who have suffered from perforation of the septum of the nose?—I know of none. Mr. Hayhurst says he can produce one.

335. As a matter of fact, I did find one man who was engaged in mixing the chrome crystals with perforation of the septum of his nose from the bichromate dust. I was pleased to hear you say that you now use it in the form of solution and not in the form of crystals.—We are only too anxious to take every precaution. We do not like our men to have cause for grumbling.

336. And in the case of accident, upsetting a carboy of hydrochloric acid into a tank of anilin oil, have you heard of illnesses so serious as to require hospital treatment?—Yes, I have heard in one case, but that has nothing to do with dye or anilin dyeing; that would apply to anywhere where acids are handled.

337. I do not mean poisoning from acid fumes, but from anilin fumes?—There is no anilin when such an accident happens.

338. (*Professor Allbutt.*) Would that come under the head of accidents?

339. (*Dr. Legge.*) Yes.

340-1. (*Chairman.*) An acid is put in first, and the oil of anilin afterwards?—Yes, that is so. I think I should mention one occasion here in 1905. Mr. Hayhurst kindly consented to come round with me to the works in order to suggest what reforms should be made. He wrote then a report which I believe Mr. Hayhurst is submitting to this Committee as evidence. At that time he wrote in that report the following—amongst the characteristics common to the occupation are—and here he gave a long list of diseases. (*Report handed in.*)

342. (*Chairman.*) Who is the writer? Mr. Hayhurst?—Yes.

343. Whom does he represent?—Mr. Hayhurst is the secretary for the workmen's union.

344. He says "I have seen the following effects—loss of appetite, excessive spitting"—you wish to make some remarks on this?—Originally it was like this: "Amongst the characteristics common to the occupation are" and then follows a list of different symptoms. To that I have written:—"Dear Mr. Hayhurst,—At our first interview I said that it was the desire of my directors to listen to any reasonable suggestion which may conduce to the comfort of the men, even if bordering on the extravagant. Therefore I do not intend to discuss with you any of your recommendations, but shall endorse the same from soap and towels to the lockers for food. But I must take strong objection to the paragraph which commences as follows:—"Amongst the characteristics common to the occupation are," etc. I do not object to the terrible list of symptoms which you state anilin poisoning will produce, but merely to the sentence above quoted, because

Mr. I. Singer. it leads one to think that the people employed in the anilin dyeing are all seriously exposed or liable to any or all of the above diseases, which you must admit now is not the case. If you said 'the symptoms of anilin poisoning are as follows': giving the list just as it stands now, I should have no objection, if at the end you added that the cases of illness at present are neither frequent nor serious, or should you object to this statement I would request you then to give the actual statistics for the last five years of all illnesses that have come under your notice, specifying, at the same time, wherever possible, the nature of the illness.

You see, we have nothing to hide or minimise; we are as anxious to know the facts as anybody, because we intend to employ every possible safeguard against anything which may cause illness or discomfort. It was for this purpose that I have been commissioned to undertake this inquiry, and I have requested your kind co-operation. I believe that in the circumstances it is our duty to publish the unvarnished truth, and no more. As I feel quite sure that your object is the same, I doubt not that you will see your way to alter the wording of that sentence, so as to remove any possible risk of misinterpretation."

345. Is Mr. Hayhurst here?

Mr. JOSEPH HAYHURST, Secretary of the Operative Dyers' Society, having been called in,

(*Mr. Singer.*) I have been reading the letter, *Mr. Hayhurst*, written to you on your report where I objected to certain expressions you used, and we have

now arrived at your reply. "In reply to yours of the 12th July last, I beg to enclose an amendment of a paragraph to which you took some slight objection. If you will kindly insert the enclosed sheet in the place of the one containing the objectionable paragraph I shall be obliged. The report may then be taken, so far as it goes, as my statement of the case. I shall be glad to join in a conference with yourself and the factory inspector upon the subject in question. Meanwhile, I remain, faithfully yours." The amended paragraph is as follows:—"First it was 'Amongst the characteristics common to the occupation'—now it reads as follows:—"I have frequently come in contact with men engaged in this occupation suffering from one or more of the following complaints."

346. (*Chairman.*) Now your point is, *Mr. Singer*, that this loss of appetite, excessive spitting, would be the result of poisoning, of the copper poisoning?—My contention is not that there have not been cases of sickness from anilin poisoning, or that the Amalgamated Association has not had to grant sick pay for it. My contention is that anilin black dyeing is not more dangerous than any other dyeing, and certainly no need to be so. Whilst admitting that the men are handling poisonous substances which in some processes are giving off objectionable fumes, the process need not be more dangerous than the burning of coal under a boiler which also gives off noxious fumes.

347. You go further than that, you say there is no poisoning?—That is so.

348. That is the point you take up?

349. (*Mr. Hayhurst.*) And which I differ from.

Mr. JOSEPH HAYHURST, called and examined.

Mr. J. Hayhurst. 350. (*Chairman.*) You are secretary of the Operative Dyers' Society?—Yes. I have sent to the Secretary of the Committee a *précis* of the evidence I want to give—each gentleman has a copy of a letter I sent, I believe. *Mr. Singer* has commented upon a paragraph which I altered.

351. We shall come to the whole of that presently. Your proof takes the form, does not it, *Mr. Hayhurst*, of a visit to certain works, and you narrated what you have seen?—That is so.

352. You visited, I think, four factories?—Yes.

353. And it is upon what you saw at these four factories that you are going to give us evidence?—In regard to the former part of it I have there stated all I can state with regard to inspection evidence, and therefore I think that that written evidence should be taken as what I saw in those four works.

354. Apart from that, this is the evidence that you wish to put before us as what you saw, and perhaps you will add anything you desire to say after that?—I will add after that the opinions I hold. The proof of evidence is a statement of fact not disputed, agreed to by *Mr. Singer* and myself, and the letter is an expression of opinion which I want to substantiate.

355. (*Professor Albutt.*) These four works are all part of the Association?—Yes.

356. (*Chairman.*) We will take these in the notes bodily.

REPORT OF VISIT TO ANILIN DYEWORKS.

June 19th and 22nd, 1905.

At the invitation of *Mr. I. Singer*, instructed by the managing directors of the Bradford Dyers' Association, Ltd., I accompanied that gentleman over the following works, on Monday and Thursday, June 19th and 22nd, 1905:

Messrs. A.

Messrs. B.

Messrs. C.

Messrs. D.

The object of these visits was to make inquiries into the conditions under which workmen followed their employment, so far as the sanitary and other conditions affecting the health of the workman were concerned.

Every facility was given me to make these inquiries, and full liberty was allowed to interrogate any workman

with the object of eliciting information upon the subject under consideration.

The following observations were made, and information obtained, in the works and departments visited:—

Messrs. A.,

June 19th, 1905.

Liquor Mixing or Brewing.

Three large tanks are fixed in a garret, the place was lofty and partly covered with glass, in the roof there would be at least eight opening windows. To my surprise although the day was hot all the windows were closed, and from inquiries from the workmen discharging the duties of mixer I was informed that it was not the practice to open them. This I could readily believe for the reason that the handles to open the windows were quite rusty.

The workman concerned stated that he had not been detrimentally affected, except upon one occasion, at the fire of another firm, while following a similar occupation, when an accident happened in opening a cask, when he was badly burned and had to be put under medical treatment.

The process of brewing was demonstrated, in which process dangerous fumes are given off. The most objectionable part of this process is in men emptying liquor into the vats, during which time the men must inhale the dangerous fumes referred to. A promise was given on the spot that steps would be taken immediately to alleviate this, not only at these works, but at all others where a similar process was carried on.

The place required lime-washing and generally cleaning up. Providing these matters were attended to, and the man in charge saw to the windows being opened, I should be unable to make further recommendations.

Pulling off Machine after Ager.

This machine was placed in a very dark room. To provide ventilation, boards had been taken off the roof, which led into a room above; this, however, did not draw the air, as the draught was through an open doorway into the dyehouse. Two men had previously given notice and left this job, alleging that it was ruining their health. The man at present employed on the work complained of green dust, and stated it affected his chest, and made him unable to eat his food. The place would be improved by a general cleaning up, more light, and better ventilation.

Ager.

This was one of the old type, constructed so that the men could not walk inside. The man in charge when questioned did not make any complaints as to the effects of the process upon his health, and further stated that as a rule he enjoyed fairly good health.

Jiggers.

Chroming jiggers.—The drainage of these is from the clack in the jigger only. There are no grates round the jiggers, and apparently no means for water to get away except through the opening named; the result was that the floor was sloppy with chrome, dyeware, and water, and presented a very unpleasant appearance.

Upon the men being asked where they washed their hands which were generally black as ink, they stated that pails were scarce, and they had to do the best they could.

The foreman stated that there was a plentiful supply of pails. We had our attention drawn to these at the end of each jigger, but as was stated they were for carrying dyeware, and had to be used for this purpose for each roll chromed.

A pail of clean water, kept for the purpose of washing of hands, would certainly be more safe and sanitary.

One man was working on the jigger with badly chromed hands. He stated that he had worked in a dyehouse all his life, but had never been previously affected.

He was recently put to a drying machine, the friction of the pieces by some means broke the skin off his hands, he was then sent back to the jigger, when his hands broke out with chrome poisoning, otherwise he seemed very healthy. At these works there seemed to be a lack of provision for men to warm their meals, or store their food or clothes, having to hang them up in any corner possible, generally in contact with dust and steam and smell. There is no dining-room, and generally the ventilation is not good.

Messrs. B.

Brewing Department.

This was quite modern, and with a different arrangement for charging. I could not make further recommendations. Two men were questioned in this department; they stated that apart from a very serious accident which had occurred recently owing to fumes given off from the process, they had no complaint to make, and were not aware that they were detrimentally affected in health.

Ager.

The only ager running was one of the old style. This was quite close to a Mercerising machine which was giving off great heat. The department was dark and almost stifling with heat and smell, and under the conditions I saw it was totally unfit for any man to work in. The men complained that they could not eat, and that they had a sweet taste in their mouths, and that green dust was prevalent. I was assured that this ager was to be taken down and another placed in better conditions. A second ager which was standing was placed in a clean, airy room, and the men in charge made no complaints.

Padding.

These were placed in a fine, airy well-ventilated department, and the men had no complaints to make. The men were provided with buckets, soap, and towels to wash their hands when necessary. A dining-room was provided, and good provision obtained for hot water and the warming of food.

Lockers are provided for storing food, but these are placed in an undesirable position, dust and smell coming in contact with the food. During the last few years great improvements have taken place at these works in the matter of increased cubic air space, better ventilation, and apart from the surroundings of the first ager the greatest cleanliness and order seems to be observed.

Every credit is due to the firm for the efforts which have been made for the comfort and convenience of the workmen.

Messrs. C.

Brewing Department.

Similar to that at Messrs B. The men made no complaints as to its effect on health, but the department would be improved by a little more ventilation.

A liquor room below this was a very undesirable place. It was without ventilation except a doorway which led into the dyehouse. Dark and sloppy. Men complained of being ill when working in this department, and several had been off work in consequence.

Padding Department.

There was more dust in this department than any previously visited. The chroming pads were in a corner which was dark owing to a wooden structure overhead, the ventilation was unsatisfactory, men were muzzled when getting on their pieces in consequence of the air being heavily charged with fine particles of cotton impregnated with chemicals. Questioned, the men stated that they could not eat their food when at work owing to loss of appetite, but this improved when they got into the fresh air and to their homes. Most of the men seemed very anæmic.

The manager stated that steps would be taken immediately to improve their department.

Agers.

These were similar in construction to other works visited, but appeared to be more crowded together. The ventilation was poor, and overhead there appeared to be a maze of pipes and hangings which darkened the place and created a general depressing effect. Provision for storing clothes, food, and for warming food appeared entirely absent. I was afterwards shown a dining-room provided with tables, forms, a long row of wash-basins, lavatories, and cooking stoves. This is not yet open, but will shortly be in use. It is one of the finest works' dining-rooms I have ever seen, and reflects the greatest credit to those responsible for its provision. I trust it will be appreciated by the workmen, and it cannot fail to create an higher industrial efficiency of the men.

Messrs. D.

Brewing Department.

This is an ideal place for the purpose. There are two large doors placed at each end of the room, and I should imagine no complaints will arise as to injury to health of those engaged therein.

Ager.

This was being run by a new process. Quite recently, in attending the machine proceeding but attached to the ager, men had been overcome by the fumes, and a number of them had been off work sick. This was admitted, but alterations were promised, which it was hoped would prevent the complaints. At this end of the ager there was no ventilation, and it was very hot and unpleasant.

At the further end was a large door, at least 9 ft. by 9ft. leading to the open air. This provided good ventilation for part of the space occupied by the machine.

Padding Department.

In two of these the driving pullies, some 18in. or 2ft. in diameter, were unfenced, and in a very dangerous position.

Jiggers.

The men here wore cloth over their mouths and nostrils when getting on the pieces to keep out the dust. There was not so much dust as at some other firms visited, and the men did not complain of being ill with their occupation. One case of chrome poisoning was brought to our notice, and the man was in a very bad state.

A large number of the windows in the roof, 5ft. by 1½ft., were out altogether, and while this state of things may help to ventilate the works in dry summer

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weather, it must be very objectionable working in wet weather. At these works there is no place to store food or clothes. We saw food in wrappers and tins in almost every part of the dyehouse amongst dust and dirt, and where chrome and other injurious chemicals were being used. There is no provision where men may warm a meal. I observed no provision whereby men might conveniently wash their hands, and men had to eat their food in any place they could find. In these respects the conditions were deplorable, and amongst the worst we had seen. In consideration of the foregoing report I desire to make the following observations:—

I have frequently come in contact with men engaged in this occupation suffering from one or more of the following complaints:—

- Loss of appetite.
- Excessive spitting.
- Irritation of the nostrils and bleeding of the nose.
- Frequent vomiting.
- Pale blue lips.
- Affections of the lungs.
- Anæmia.
- Palpitation of the heart.
- General debility and loss of flesh.
- Chrome or other chemical poisoning.
- Irritation and rashes on the skin.

The direct cause of these complaints I do not presume to have the technical and scientific knowledge to explain, but that they are facts I am certain, because they have come under my direct observations.

During the last two or three years I am glad to state that, in my opinion, great improvements have been made.

The preparation and handling of the dye stuffs have been improved. The general sanitary arrangements have undergone marked change for the better. The quantity of green dust impregnating the atmosphere has been greatly minimised, and artificial ventilation by fans has been largely introduced.

But there is yet room for further improvement.

I am satisfied that one of the most contributory causes of many of these complaints is when the pieces, after passing through the ager and taken to a jigger or pad, and during the first end while dry, give off fine particles of cotton and dust, which are impregnated with the chemicals or dyes through which the pieces have previously passed. This being in many cases inhaled by the workmen, either through the mouth or nostrils, must come into contact with the lungs or stomach, and set up some of the complaints named.

Strict attention should be given to ventilation to remove as far as possible the pungent smell common to all aniline dyeing.

Ample provision should be provided for workmen to wash their hands after any process that might be proved to be injurious.

Rooms should be available where workmen might put their clothes not required to be worn when working, so that they would be fresh and sweet after leaving their employment.

Lockers should be provided for the workmen's food, so that it should not be about in dust, steam, and dirt, and so that it may not, as at present in many cases, become tainted before it is eaten.

An adjournment to a dining-room in which to partake of meals could not fail to have a beneficial effect.

I desire to express my thanks for the opportunity given to me to make the observations herein contained, and I trust improved sanitary arrangements, continued forethought for the comfort and health of the workmen, may produce a more healthy, contented, and industrially efficient operative.

357. (Chairman.) Instead of taking you all through this, I simply propose to put that in as your notes of the visits. Now in these notes you describe the processes that you there saw?—Yes.

358. You say now in the first place, with regard to the process of brewing or what would be called mixing—I suppose it is the same thing?—Yes.

359. Mixing the anilin oil with certain acids?—Yes.

360. You say that dangerous fumes were given off?—Yes.

361. "A most objectionable part of this process is in men emptying the liquor into the vats." Do you mean the acid from the anilin?—That I can hardly give you

a scientific explanation of; it is when they have put the acid into the anilin oils that fumes come out, during the process of what we call the brewing.

362. Yes, I think we may take that as common ground admitted by Mr. Singer and everybody—that if those fumes were inhaled they would be dangerous?—So dangerous that men have been at the infirmary three days unconscious with them.

363. Do the men inhale the fumes?—I have a man here who has worked at this job, and he has had to be taken off the job because of the danger to his life. They cannot avoid the fumes.

364. That is the point. Mr. Singer thinks they can be out of the room?—That is impossible under existing circumstances.

365. Could not they leave the room directly the acid had been mixed?—No, for the reason they have to put the acid in from carboys. Two men pour it in. The moment the acid gets into the lift the reaction of the various chemicals begins to operate.

366. I understood that the acid is put in first and the anilin oil is put in afterwards?—Whichever process is adopted, the result is the same.

367. Whenever they get in contact, whichever is put in first?—Whichever is put in first this brewing or reaction starts.

368. How long does it take to empty the carboys?—That is the point I should like—

369. The point is that the men are not present in the room where the tank is, where the mixing takes place?—That I absolutely deny.

370. It is only in some of the works where the precaution of putting the tank in another room different from the place where the acids are poured in is adopted?—Yes.

371. If there are places where it is not carried out, there are places where the men are subject to poison?—In my written précis I have said that these mixing rooms should be made the subject of regulation.

372-3. Your point is that in certain cases where the men are present at the mixing, deleterious fumes arise which are poisonous?—Yes, and that takes place at present.

374. Did you see at the works of Messrs. A. men exposed to these fumes?—Yes; I had better say that I saw both the men and the method of mixing. There was no other way except of taking a carboy to the top side and pouring it in.

375. Did you see the fumes?—They were not brewing at the moment, but I have the man here who did the brewing.

376-7. Now, have you anything to say about the ager?—With regard to the ager, there is this about it: When you get into a place where the ager is there is a strong pungent smell. I think there is harm, but it has been vastly improved from what it was. Wherever you have an anilin dye-house, even in the office itself, you are affected by anilin. If you will take the trouble to sit in the office at any anilin dyeworks for half an hour I venture to say you will have several sensations. You will smell strong, pungent smells; the next is that you want to wash your hands, they become husky and hard.

378. The fact that you have smelt a smell and your hands become affected would not necessarily prove that there was a poison. You can imagine one having a very smoky chimney in a room, but one is not poisoned?—I am not saying that this is poisoning.

379. What is your point, then?—I am only saying that this is some evidence that there is some substance present other than there is in this room or in the street.

380. Now then, have you anything to say about the jiggers, the chroming jiggers?—The men at the chroming jiggers are affected largely in some branches. After the stuff is chromed it gives off a copper dust. I am not a chemist—from the common observation point of view the chrome affects men's hands. I have here three photographs (and I have got the person here) to show how men are affected.

381. Now I think you may take it, Mr. Hayhurst, that Mr. Singer fully concedes that these pustules affect the skin. There is no use our disputing facts admitted. There is no doubt that these ulcers are pro-

duced. Mr. Singer's view is, that though these eruptions are very unpleasant, they do not really incapacitate the man from work, at any rate, not to his knowledge immediately. Only a certain number of people are subject to these pustules, and he admits that they can be produced in a certain number of men, and an appreciable number of men, but he says that it is very easy to get rid of them by transferring those affected to another branch of the establishment, and the ulcers will then heal up?—That is true in some cases, but we have innumerable cases where once men have become affected by chrome it appears as though in springtime and autumn the disease acts upon them again, and all the symptoms of chrome poisoning repeat themselves.

382-3. (*Professor Allbutt.*) When they have gone to another works?—Yes; and we have men who have been affected ten years, and as sure as the autumn comes round they are affected not only on their hands, but all over the body.

384. How far does that breaking out, though of course it is unpleasant—how far does that prevent a man working?—It will depend on the part of the body on which it breaks out. If it breaks out on his chest or his back he may work, but if it breaks out on his hands, it is not safe for him to work, because when the matter bursts there is an exposure, and he may come in contact with chrome and get blood poisoning.

385. Then the eruption may arise in parts which are not directly exposed to the poison itself?—The effects of chrome poisoning may show themselves in his hands, or eruptions may break out all over his body, even where chrome has not touched it.

386. It is not necessarily confined to the parts which come in contact with the chrome?—Oh, no, Sir.

387. (*Chairman.*) I think you were inclined to be of opinion, from the inspection of Messrs. A.'s works, that some more pails and washing apparatus would be a good thing?—I do, sir. They were absent when we were there, or rather I should say they were present, but the men were told to wash out and use the pails that they were using in anilin dyeing, and it seemed to me that the water would be a solution of water and anilin dye.

388. But apparently, as far as we can learn, am I not correct in saying that, so far as the washing apparatus and so on is concerned, the employers, at all events in this Association, seem desirous of doing all they can to improve matters?—I believe some of the employers in this Association have adopted the best means, and are most ready to take up suggestions for the improvement of the works and for the minimising of danger.

389. And they would provide washing apparatus?—I suppose you want me to be perfectly candid. Well, I believe this inquiry took place last year—it was a joint inquiry of Mr. Singer and myself—and our recommendations have not been carried out, and it would be wrong for me to say that they readily take up suggestions.

390. They are ready to do so if pressed?—I quite appreciate Mr. Singer's efforts to improve this occupation, but Mr. Singer, like myself, is a servant, and the improvements have not been carried out to my mind to the extent that the seriousness of the case demanded.

391-3. Now you went to Messrs. B.'s works. Have you anything particularly different to say with regard to those works other than you have told us?—I regard these works as probably the most sanitary that there are in the anilin trade in this district.

394. You consider this one of the best. Did you there see the mixing department?—Yes.

395. Was the mixing done by the men pouring in the acid?—It was poured by the men directly into the tank. When they were brewing the men had to stand at the tank side while the fumes were coming up.

396. They had to?—Yes.

397. I gather that the ager was an old style ager?—Yes, Sir.

398. Now the men complained there that they could not eat, and had a sweet taste in their mouth, and that green dust was prevalent?—Yes.

399. Did you see the green dust?—I did.

400. What is that composed of?—It appears to me

to be dust which comes from a piece, after it has been through the ager, and to consist of particles of dye. A certain action of these dyes takes place in the fabric, because actually it is not dyeing, it is creating a chemical change, and in that change there appears to be a process very much like brewing, and certain elements are given off. When the pieces come out of the ager they pass through the jiggers and the drying machine. It is in these processes that dust is generated, and these particles float about the air, and you will see in any dyeworks, if it has not been recently swept up, a very large amount of green dust, which is said to be some of the copper or verdigris, as it is described by the men.

401. And is that, in your judgment, what produces the dust?—I think so, Sir.

402. Is there anything else in that factory to which you would like to call our special attention?—I think it is one of the best I visited.

403. Now take Messrs. C.'s works; how was the mixing done there, or the brewing?—In the same way as at Messrs. B.

404. The men there would be exposed to the fumes?—Yes.

405-7. You did not see the fumes?—I do not remember that they were actually putting the liquids together when we were there. The dust has always been more prevalent at Messrs. C.'s works than at any other works. There we have always had the most serious causes of complaint, and I shall ask you to go to the Bradford Infirmary to see the latest forms.

408. Now we come to Messrs. D.'s works. How is the mixing done there?—The mixing there was the best I saw, for the reason that at each end of the building there are two great doors where the air is passing through. Here, again, the men put the liquids through the tank when mixing takes place, but the strong currents of air seem to minimise the objection, not to get rid of it altogether, but certainly there would be less cause of complaint.

409. It would be a very obvious precaution to pour the liquid from one room into another and let nobody be in the mixing room?—As to the technicalities of that process, I hardly consider myself able to judge. I have a man here who has done the job, because the two men who mix have certain things to do. They have what is commonly called in the dyehouse totalling the specific gravity, and in that it is necessary for them to be very precise, or else the blacks are weak unless the liquid is made to a proper proportion. Of course, it may be alleged that if you put a carboy of one proportion and something else of another it will be exact. Nevertheless, these men are called upon from time to time to say that the liquid is in proper proportion.

410. You mean that somebody must be in the room?—What I mean is that the men employed have responsibilities apart from actually pouring the liquid in.

411. Now with reference to the ager in Messrs. D.'s works: is there dust there?—There is dust in all agers, arising from the ageing. When we were there they were dyeing what is called a prussic process of anilin black dyeing—pardon me being short of the scientific knowledge—and three men, during the week previous to our going, had fainted away exhausted from the fumes and the prussic process.

412. I think we will now take what you know about the diseases and illnesses resulting from this dyeing. You had better give it us in your own words?—This is the most difficult part of our whole business, for while medical men do give us certificates saying that the diseases are caused by the occupation, they are reluctant to go into particulars. Although men do not die immediately of these diseases, I am satisfied that a very large number have died of these trade diseases and of complications arising from them. Our difficulty appears to have been that when we have pressed the medical men, although they have given certificates that the disease arose from the occupation, they seem to have had great reluctance to go into detail. For what reason I cannot say. I have enumerated in the last page of that report some ideas of mine, in rather a crude way, as to the effects of anilin dyeing. Dr. Legge has also made a report upon the subject, with which I heartily agree, and I do not think I can give much better evidence than what is stated in the report of Dr Legge, and it seems to me to put

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413. Was that stuff from the stomach ever analysed?—No, I do not think it was.

413*. What was the date of that case? Was this the death certified on the 24th of October, 1906?—You have a copy of the death certificate.

414. I suppose, Mr. Hayhurst, that part of the hesitation of the doctors in these cases is owing to the difficulty of saying whether the particular illness is due to poisoning or due to something else?—They draw up the certificates in the first place in a vague way, as doctors usually do. First, I have put these certificates in. They are all very specific, but when we ask them to make out a report we find that they hesitate very much. I might give you my experience of that. We decided to make an investigation into anilin and chrome poisoning. We engaged Dr. Eurich and Dr. Munro to conduct the investigations, and the men were to be brought to my office to be examined. Dr. Eurich conducted the investigation for about one month. He then asked me the object of this investigation and I told him that the object was that we were securing evidence to prove that anilin and chrome dyeing were dangerous. I never saw Dr. Eurich again, although prepared to pay for his services. Dr. Munro finished the investigation, and here is his report. (*Report handed in.*)

415. Now we come to these certificates that you have handed up. I will read one. I will read a portion of it. "I hereby certify that I have been attending Mr. — for the past two days. He has a severe ulcerated throat with high temperature." And then "probably the throat has been caused to a certain extent by working with chrome"?—That is very vague.

416. But that illustrates the difficulty which I am assuming a perfectly honest doctor may feel with regard to citing a matter of this sort?—You will see, Sir, that medical men, as a rule, have no knowledge of occupations, and especially chrome and anilin dyeing. Chrome they have, but in the matter of anilin dyeing they have not been conversant with the various processes of brewing or with an ager, and they are very reluctant to express opinions.

417. And that rather points, you mean, to the employment of some medical man who has a vast experience of these particular diseases which you allege to be due to employment?—Yes, but to myself who see these cases, they are peculiar to the trade. The same cases do not occur in other phases of dyeing.

418. There are certain cases at the hospitals here which you can show?—I have one I want you to see.

419. You have cases of anilin poisoning of which you have had no doubt yourself?—I will bring men in, and I submit probably that they will yet have traces of affections about them which would demonstrate to you the direct cause of this complaint.

420. Is it said by the doctors you have consulted or who have given you their opinions that this poison is so specific that if you had a very experienced man he could definitely pronounce that this is anilin poisoning, and not anything else?—I have not had that opinion expressed to me.

421. The symptoms then of anilin poisoning are rather like the symptoms you might get from ordinary disease, the mere symptoms?—The symptoms so far as I can see become complicated, and if I was to express an opinion it would be this, that when a man becomes affected with anilin poisoning we expect his physique to rapidly fall, we expect him to lose flesh, to become anæmic, and were it possible for me to bring 100 men before you out of five dyehouses in Bradford, I would allow you to form your own opinion,

and I do not expect that it would differ from mine. Two things would attract you—the weakness and the want of flesh and the high state of anæmia, and if you had them in a room you would smell them as though some effluvium was exuding from the skin. The air becomes impregnated where they are together in a room, and the odour is easy to tell.

422. A peculiar odour will exude from an anilin dyer, a peculiar odour will exude from a man poisoned with anilin which a person can recognise and say it is anilin?—It will exude from 100 workers who have not been under medical treatment. I have had 100 men in a room with me.

423. (*Professor Allbutt.*) You are speaking independently of the clothing?—They have been in their clothes.

424. That is very important. You said it exuded from their persons.

425. (*Chairman.*) You say there is a specific smell from anilin dye workers quite different from that of other workmen?—Yes.

426. Something specific, that a person can recognise?—Yes.

427. And you can?—They all smell.

428. (*Professor Allbutt.*) But supposing they were in their Sunday clothes?—The same thing has been observed at a meeting on Sundays.

429. (*Chairman.*) Might it not be that they had got a lot of anilin on their clothes, and it was not their exudation?—At meetings on Sundays—I am not giving evidence which is scientific—when they have not their working clothes, where there are 30 men confined in a small room there are traces of the same smell.

430. (*Professor Allbutt.*) But in a much less degree? That suggests that it is largely a matter of clothing?—I suggest that the poison gets into the system and exudes through the blood or through the lungs.

431-2. Your two facts are these. That under ordinary circumstances when the men have their dyehouse clothes on, the effluvium is very definite, and that on Sundays when the men have got clean linen, and certainly not dyehouse clothes, this smell is very much reduced?—It is different to the smell of a meeting of men engaged in ordinary bleaching. Some part of it remains.

433. (*Chairman.*) The point I am trying to elucidate is this. The Bill provides for compensation to men injured in the trade, but it appears to be rather difficult on all hands to be quite sure that the diseases mentioned by you are caused by the trade. Look at the certificates, you see where the difficulties arise?—Well, when the symptoms are so common and appear in so many men who are employed in this occupation, it seems to us only proper that the diseases should be regarded as due to occupation. We do not want to appear in any hostile or vindictive spirit on this question, because so far as the Bradford dyers are concerned they have done a great deal to minimise the danger, but when we get a man who is robust, who has ruddy cheeks and who is physically strong, and we send him into the dyehouse, and we see the same insidious change happening in each case, we are driven slowly but gradually to the conclusion that the same force has been at work. Indeed one man I could produce, who, while working at one of these works, turning the stuff into the liquor, has lost his voice—he is now working at another factory of the same kind, and may be seen to-day. It may be a difficult thing to prove that the loss of the voice was necessarily due to his occupation.

434. You are very likely right, but it is difficult to prove?—He was overcome with fumes, went home, and never has had his voice since. He had to be taken out, but he was not absolutely unconscious.

435. And that did the voice a permanent injury?—He was at home some time. He has never had his voice since.

436. Some of these are old cases, but Mr. Singer is of opinion that there are not many cases now at all events?—There are two quite recent cases.

437. What are the dates of these cases?—The sixth certificate is signed 13th of October, 1906, and the man now lies in the infirmary suffering from dropsy, and I am convinced that this has been caused by the

action of anilin on the heart, which has been a contributory cause of the dropsy.

438. Is that one of the cases you want us to see?—Yes.

439. (*Professor Allbutt.*) I might perhaps try to clear the subject, which is a very difficult one, in this way. You allege first of all that anilin—I do not quite understand in what precise way—we can leave that—that anilin slowly and insidiously invades the system with a certain group of symptoms, we will say anæmia, heart affection, and so on—that is a series which would be fairly constant if made out. That series of symptoms would be fairly constant. There would be no difficulty in making that out?—I do not think you will have any difficulty in making that out by examining people working in the trade.

440. (*Chairman.*) We shall be able to establish a pretty constant series of symptoms?—The case is clearly made out by the report of Dr. Legge, which he published in November.

441. (*Professor Allbutt.*) Then there is the question of complications. When we speak of a complicated case in medical language, we mean that the man may or may not have been so reduced by this process that he becomes a victim to some other disease?—Yes.

442. If you could keep the thing a little clear in your mind, between the constant symptoms which follow anilin poisoning and the subsidiary affections to which any man may be liable—it is very important to us to get the uncomplicated, more or less constant, series of symptoms directly due to the anilin poisoning itself—if we settle that, then we can decide what are complications. If you, as a common-sense observer, can help us, as you are now doing, by giving us the characteristic series of symptoms, we should be much obliged to you. What do you think are the characteristic symptoms in an uncomplicated case? I will put it in this way. So far as a common-sense observer can tell us, what would you say is the series of symptoms characteristic of anilin poisoning, omitting for the moment any undercurrent disorders?

443. (*Chairman.*) Before you answer the Professor's question, I should like to find out what is meant by the phrase anilin poisoning. Is it a general expression of the dyeworkers at dyeworks?—Yes, it is a general expression.

444. Is anilin regarded as a poison?—That I cannot explain; it would require a scientist.

445. In your department do these deteriorations of the system take place?—It is common to all departments except in the grey room; it is common in the ageing, the padding, the jigger, and the drying machines.

446. But surely the conditions are very different in those departments?—As a rule the ager is in contact with the padding machine; the material goes through the mercerising process, where there is no actual caustic, and other things. There can be no anilin there. It is dried, and then goes to the preparing pans. There the anilin liquor comes from the brewing. Close to the preparing is the ager, right close to it, and then at the end of the ager are the striking pads or jiggers, and at the end of the jiggers, the chromating jiggers, is the washing-off machine and the drying machine. Now during all these processes there seems to be this takes place. First, there is brewing, the most dangerous process; the liquor goes into the preparing pan, and the piece goes through and takes up part of the liquor. It then goes through the ager at a temperature of 130 to 140. There appear to be some changes take place there, and the liquor in some form crystallises. That gives off a fine dust, the pieces go through and at the end they get dried. Then when those pieces are taken to a jigger there is certain flapping about, and you may see the dust on the machines, on the floor, and on the shelves. That dust is inhaled by the men, and it gets all round the department.

447. (*Professor Allbutt.*) You suggest that in all the departments except one this supposed poisoning is present?—I do, Sir.

448. In all but one?—All but the preparing, the singeing, and the grey room.

449. Can you go a little further than that, and say whether you consider that the chrome has anything to do with that?—The chrome?

450. The effect of chrome on the skin?—I think the

effect of chrome may operate both on the skin and the system.

451-3. We admit that it operates on the skin. We know that already. What symptoms would arise from chrome affecting the general system, or can you not divide that from the anilin?—I do not know how to make a dividing line.

454. We will put the chrome out altogether, except so far as it affects the skin. But the peculiar thing about this anilin dyeing is that you can hardly put it out, for the reason that when the piece has gone to the preparing room —?—To the dyehouse where there is no anilin.

455. In that case the only symptoms we find are irritation of the skin through chrome poisoning where chrome is used?—We have had cases where the dye is mixed not necessarily from anilin but coal tar, but we think that this has arisen from the men having inhaled.

456. There we are getting complicated, but so far as you know where there is no complication with anilin the effects of chrome poisoning are purely external?—Yes.

457. The anilin does not produce any external effect upon the skin?—I have not observed any.

458. I think Mr. Singer said it ought to be washed off very quickly?—I presume that it is washed off to prevent the chance of it getting through the skin.

459. Having come to that, I should like you to go back to the old question and give us, in your common-sense way, the series of symptoms that you have observed in persons who are subject to the anilin?—First of all, let me say that no man will go into the anilin dyeing if he can get a job out of it.

460. That is not exactly an answer to my question?—I want to show you that the men themselves do not choose anilin dyeing, the ordinary run of dyeing. I find as a rule by keeping the men under observation that they lose flesh, they lose weight, they become anæmic. Their lips as a rule are blue, and they complain that they are sleepy and drowsy. One man recently who was very robust I sent to one of these works. When he had worked a fortnight—he was a cyclist and an athlete—he did not know what was the matter with him. He said: "I have never in my life slept during the day, but when I got home on Saturday dinner time I sat down and I slept till nine o'clock, and my wife—during the week when I sit down I sleep." It produces a sense of lassitude and drowsiness. They all seem short-winded. If they walk or run—there are no runners amongst them—you cannot get athletes out of anilin dyeing. They have palpitations, and they think it is their hearts. The doctor says it is the blood. From that there seems to be a number of complaints arise.

461. I think we might stop you there—those symptoms you would consider the characteristic series, any of the others might be accidental?—There are affections of the lungs.

462. We will come to the lungs in a moment. With regard to these blood conditions, can you give us any idea what proportion of men have suffered?—In the anilin dyehouse they all suffer more or less from the symptoms I have enumerated.

463. Universally?—Where the ager and the preparing pans and the chrome are in conjunction.

464. No man would escape in some degree?—My opinion is not. They are all affected more or less.

465. How are the local organs affected—lungs or anything else?—It has occurred to me that a man having worked in these conditions becomes attacked with a complaint. He does not know what. He spits blood, or he has a disease such as dropsy, as in the case of the man I cited.

466. These are odd cases; you would not call them characteristic?—The characteristic symptoms I have given. Having weakened the system, it appears to me that it attacks a man in the weakest place.

467. We all know that when a man is lowered in vitality he becomes more easily a prey to disease. I think I have no other question to ask.

468. (*Chairman.*) Is there anything else, Mr. Hayhurst, you would like to call our attention to in connection with this matter? It seems to me rather a case in which good might be done by some special rules

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in the trade. Such a rule as, for instance, that the mixing be so arranged that the person who was pouring could not be exposed to the fumes?—Yes.

469. That it would be rather a good thing to require that in the whole of the trade?—Yes.

470. Or perhaps some requirements as to washing might be a good thing?—Yes, sir.

471. Do the men whom you represent work in other factories than those of the association of Mr. Singer?—Some of them do.

472. There are some small works that are rather behind the times, and some special rules would aid in bringing those gentlemen up to the standard of the better firms?—Yes.

473. Is there anything else you would like to add?—There are just two points. We are asking that the man who suffers from this, and can be proved to suffer, should have compensation, and we hope that any rules will not be optional rules.

474. What do you mean?—Not merely a recommendation.

475. You mean that the rules should be compulsory?—We feel that it would be most unfair to handicap by rules the Bradford dyers, who have made the most concessions—put up dining-rooms in some places, and have always met us in the most sympathetic way—it would be unfair to handicap them and not compel the other people who are engaged in competition with them in the same trade to comply with those rules also. It would be most unfair to the combine, and against the interests of the men. Any rules should be compulsory.

476. Have you any impression whether these complaints, these symptoms that you have mentioned to us, are more prevalent amongst men in the worst shops?—In most of the other shops anilin dyeing is a part only of their process. The Bradford dyers have specialised. They are all anilin dyers. In many places they are dyeing wool and cotton, and the men are changing, and it does not attack them so much as a man at a regular job.

477. (Professor Allbutt.) Are you of opinion that in the best dyeworks in Bradford that there is nevertheless some measure of this poisoning going on?—I am satisfied that this poisoning does prevail in the very best works.

478. (Chairman.) Is it inhaled or taken from the hands?—I believe it is taken from the hands, and also inhaled.

479. (Dr. Legge.) Taking up this point of special regulations. It is a matter of ventilation, removing fumes, and preventing people breathing the fumes?—I think that is one part of it.

ALFRED SMALLEY, General Secretary of the Bleachers', Dyers', and Finishers' Association, called and examined.

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Smalley.

490. (Chairman.) You represent, I understand, the bleachers of Lancashire and Cheshire, and you agree with what Mr. Hayhurst has said?—Yes.

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Stewart.

492. (Professor Allbutt.) Dr. Hamilton Stewart, I do not know whether you are kind enough to come to tell us about this one case of poisoning from African boxwood in shuttle making, or whether you had more than this experience?—Just this one case.

493. It is the only case you have seen?—The only case I have seen. One or two other cases have been suspicious, but I have not been absolutely able to confirm them. There has probably been something else the matter with the other cases at the same time.

494. I read this paper of yours last night. What is the date that you were good enough to write this?—I wrote it a year ago. But I really got notes of it between five or six years ago. I saw the man at first when he had this attack, he was 34 years of age then.

495. Have you seen the man since?—Yes, I saw him the day before yesterday.

496. Would you like to make a general assertion of this kind that when this illness came on, apparently,

480. There is also the matter of washing accommodation?—Yes.

481. And if those two were thoroughly carried out, as they might be under the Factory Act, it would be unnecessary to have any special regulations?—I do not say that. Take two men working together. One man falls and breaks his arm, another man is attacked with a heart affection, which can be demonstrated to be caused by anilin. If one gets compensation, the other ought to also.

482. But would special regulations effect any improvement?—We submit that if he is off his work two months or three months, and the disease can be directly traced to the inhalation or absorption of anilin, that man ought to come within the Workmen's Compensation Act.

483. You were saying that all the men were affected?—More or less.

484. Would it be safe to say that not 5 per cent. of these men go on your sick club during the year. I grant that they are affected to a slight extent, but is it an exaggeration to say that 10 per cent. go on your sick fund for relief because of symptoms produced in this way? Are 10 per cent. of them ill during the year, so ill that they have to give up their work?—I could not give evidence which is reliable. It is somewhat complicated. We have certain rules that a man has to pay his money weekly. If he runs over thirteen weeks he cannot draw sick pay, and does not bring a certificate, so that there are cases which do not come to us; and as to the percentages, unfortunately, though I have taken the names and some particulars of all the men who fall sick and come to us, I could not with certainty answer that question.

485. But you can say whether it was 10 per cent.?—Well, it would be a case.

486. Out of the men who were affected it is only a small proportion that would come in under the Workmen's Compensation Act?—I suppose it would have first to be demonstrated that the man was suffering from the effect of some cause in the works.

487. And to such an extent that he was prevented from earning his living?—Quite so.

488. The illness must mean that he cannot earn his living, and the number of those would not be so very large?—If I put it at 5 per cent. I daresay it would be somewhere near the mark.

489. But you would recognise it as a great relief to get that measure, this 5 per cent.?—I think it is an element of justice to the men who are prevented from working.

491. We take it, of course, that you present the same case?—Yes.

Dr. HAMILTON STEWART, called and examined.

certainly it was associated with his work during his time at the shuttle works; would you say that when he left that work or when he was taken off that work for a time, at any rate, that he gradually improved?—Yes, he is quite right now. He begins to improve almost immediately after he is taken off that work.

497. And has he gone back to that work?—Yes, he goes back to shuttle making, but when they begin to use that special wood he leaves off work now, so he has not had any attacks for some time—very considerable time.

498. He is working under different conditions?—Yes, whenever they begin to saw that wood he leaves the work, and then he is absent for the time, but I saw him during an attack several times, especially once. You will notice from the account of the case that he was very ill when he had this very acute attack. He was ill for three weeks, and on getting better I sent him to Ilkley Convalescent Home. He was away

six weeks, and on returning he started his work again, but, unfortunately, they were using this wood again, and that same day he was as bad as ever.

499. Coming a little further, asking you in some degree as an expert, your opinion is that his suffering was due to working this boxwood?—Yes.

500. And in a few other cases to a slight extent?—Yes.

501. Is there anything you would like to say more about it?—I do not think so. The man is all right now. He is quite a healthy man. After he has had an attack like this he is right a few weeks afterwards.

502. (*Chairman.*) Do other people suffer besides? Does everybody suffer exposed to the wood, or is it rather an idiosyncrasy?—It is an idiosyncrasy to a certain extent. There are some men who do not suffer.

503. It is said he leaves when they begin to cut the wood up?—Yes.

504. Other people are engaged with this same wood, I suppose?—I do not think they have cut up much of this wood in this shuttle shop now for some time.

505. You said he left when they began to cut wood up. Does anybody else cut it there?—Yes, but none suffer so markedly as he.

506. But there are some other cases?—There are, from what I have heard; there are other men who have suffered.

507. (*Dr. Legge.*) From what you have heard of other men working—from other men working there?—Yes, there are other men who do not stand it well, but the symptoms are not so marked.

508. Has this wood been tried on animals in any way, with the view of seeing whether it is poisonous?

—From what I have read I think there have been some experiments.

509. You do not know anything about them personally?—No.

510. (*Chairman.*) One other thing. Is it a disease that is easy to diagnose, so that you could say at once this is a case of African boxwood poisoning?—It would be difficult, I dare say, without knowing that the man worked at the shuttle shop. I should be very suspicious. In this case when the man was very bad the attack looked somewhat like an ordinary attack of spasmodic asthma, caused probably by the inhalation of dust. Yet I had never before seen an attack of asthma cause so much cardiac depression in such a short time. On the other hand, it did not quite conform to the ordinary type of cardiac dyspnoea—there was more difficulty with the expiration than is usual with such attacks. And there was no evident cardiac lesion. The attack seemed to come between an ordinary attack of asthma and one of cardiac asthma. He had more difficulty with the expiration rather than with the inspiration.

511. Your diagnosis must depend upon the nature of the case and the history of the case and of his occupation?—And the appearance of the man, running at the eyes and nose, sneezing, and the appearances of cardiac failure, etc.

512. Do you think if you knew anything about the history of the man, where he had been employed, that you could tell he was suffering from boxwood poisoning?—I think I could now.

513. You think you could now?—After seeing this case. I have never seen anything like it before.

514. It struck you as something anomalous?—Yes, it was quite anomalous, and did not seem to conform to the ordinary type of anything I had seen before.

Dr. H. Stewart.

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THIRD DAY.

Friday, 2nd November 1906.

PRESENT :

Mr. HENRY CUNYNGHAME, C.B.
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.
Mr. T. E. BETTANY (*Acting Secretary*).

Mr. A. L. McCULLY, M.B., called and examined.

515. (*Chairman.*) Have you ever been appointed as medical referee or anything of that kind?—No.

516. You are a medical practitioner in the town?—Yes.

517. Have you seen a number of cases of anilin or of chrome poisoning?—Yes.

518. Have you been called in on behalf of the employers or the men?—On behalf of the men themselves.

519. You are a workmen's doctor?—Yes.

520. (*Dr. Legge.*) But you are also appointed by a firm to examine the workmen every two months?—Yes.

521. (*Chairman.*) By whom?—By Read Holliday and Sons.

522. Do you act for any other firms?—No.

523. How many men do Read Holliday and Sons employ?—Between 400 and 500 men.

524. Is that in the nitro-benzine department?—Not so many in that department. In the nitro-benzine department not more than ten or twelve.

525. How long have you been in practice?—I have been here about seven years, and I have had that appointment during that time.

526. Have you seen some cases of nitro-benzol poisoning?—Not acute cases.

527. How many have you seen?—At least 20, taking all degrees into consideration.

528. Over the seven years?—Yes.

529. Can you give us an idea as to how many operatives employed in these processes that twenty is selected from?—It would include the same men on more than one occasion.

530. Twenty cases in how many men?—From ten or twelve men.

531. To put it into another way, out of 100 men employed in connection with di-nitro benzine, how many would you say were likely to be sick at one time, have you any idea?—I have no idea. I could not say. I could not commit myself to any statement.

532. I suppose it would not be more than 2 per cent., or would it be 20 per cent.?—Not 20 per cent.

533. Not 10 per cent.?—I do not think so.

532. I suppose it would not be more than 2 per cent., get some conception of what the figures are?—I have never gone into the matter statistically.

535. (*Professor Allbutt.*) Perhaps you might, medically speaking, say whether there is any idiosyncrasy

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in the men, whether some never suffer?—I cannot say at present.

536. (Chairman.) Would you please give us in popular language what you might term a description of the illness?—Judging simply from what the men describe when they come to me, or when I go to see them, they are suffering from great languor and prostration, and generally very severe headache. They invariably complain of headache. They tell one first that they are passing little water, and it is very high coloured.

537. Have you analysed that water ever to find the cause of that colour?—No.

538. Are there any other symptoms, not those which would depend merely upon what the men told you, but which you could see for yourself?—No, except the lividity. There is a considerable amount of lividity. It is the most striking feature. The lividity is the most striking thing. It arrests one's attention at once. The amount of lividity of the tongue and lips and the inner surfaces of the eyelids.

539. Is there any trembling of the hands?—I have not noticed a visible tremor.

540. (Professor Allbutt.) No visible tremor?—I have not noticed it.

541. (Chairman.) Have you noticed nervousness in any form?—Do you mean the men complaining?

542. Either the men complaining, or you being able to verify their complaint; a third person being able to verify it?—They have told me that they have felt afraid of falling, but it is not due to nervousness as much as to a sense of giddiness. They feel nervous walking about their work. I think this is from the physical feeling of giddiness.

543. Have you ever analysed the blood of any of these men?—No.

544. Are there any symptoms to which you would like to allude as characteristic of this poison?—Yes. General muscular weakness. They cannot grasp your hand. If you try them in the ordinary way they cannot give you anything like a hand grasp, and they complain of being unable to do ordinary light work in the house.

545. Have you any knowledge of whether any of these men before they became ill belonged to athletic societies?—No, I have not.

546. And have ceased to belong to them?—No, I have not.

547. When they become ill, what is the remedy that you would prescribe as a rule?—In the way of drugs?

548. And also in treatment of any sort including drugs?—They stop work, and I advise them, when able, to keep out in the open air. When a man is able to walk out to the parks and go on to the top of the tram cars, and to have plenty of light nourishing food, and to keep off beer, he soon improves.

549. (Professor Allbutt.) I suppose you advise them to keep off alcohol of any kind?—Yes.

550. (Chairman.) And do you give them any drugs?—As far as drugs go, I usually give them carbonate of ammonia, which seems to do them as much good as anything. Later on I give them iron when they have got over the sub-acute stage.

551. Can you give us any idea of the time these cases take to cure—severe or light?—The lightest case, say a fortnight. At the end of a fortnight the man expresses himself as fit to go back, although he does not always look fit, but he says he is fit to go back, and voluntarily goes back. Other cases I have known to be off four or five weeks, and on one occasion a man was off his work six weeks.

552. Does even a severe case get cured in six weeks as a rule?—Yes, any I have had experience of.

553. Has any man died?—None at Read Holliday's in my own experience.

554. Does it, in your opinion, in cases with which you have been acquainted, leave permanent results upon the man, his heart or any other organ?—I do not think so, beyond a degree of anæmia. They do not seem to get rid of that altogether.

555. But if they changed employment it would not be permanent, would it?—I do not think so, it would improve.

556. Then by careful diet and regimen for a suffi-

ciently long time the cases will, according to your acquaintance with the disease, improve?—Yes.

557. I suppose you have visited the works and seen the men at work?—Yes.

558. Would you say that a number of them were still continuing at work when you would rather like to suspend them if you could?—Yes, certainly.

559. Can you give us any general proportion of the number of men—without saying that they must at their life's peril cease—for whom you think it is not a very healthy work?—A very large proportion of them. I could not give the exact proportion. If you go down and see the men, you would pick out the men employed in the bi-nitro department. Every man is cyanosed as compared with outside occupation. They all show the blueness, all of them I have seen—an almost chronic condition.

560. A chronic unhealthiness?—Yes, certainly.

561. Something like the chronic unhealthiness there may be amongst clerks in the city leading a very sedentary life?—Yes, even when they make no complaint of feeling unwell or unable to work, they all present this livid appearance.

562. Is it not an employment which it would be wise to follow for six months, and then change the employment for six months, and then bring the men back?—That is the very point I have tried to emphasize with the members of the firm, the necessity of having two or three sets of men, and varying them.

563. Has any objection been found to that?—I am afraid so. I am afraid it is not put into practice.

564. You do not perhaps know enough of the organisation of the firms to say whether it could be done or not?—It should be possible. The objection is this, that the men who are working at it for years know the plant thoroughly, and it would mean training a duplicate set of men.

565. But the work itself is not of such a complicated or difficult character that it takes very long to learn?—I believe the preparatory stages require a good deal of time.

566. I was just going to go on with that. You think it is a trade which takes some time to learn?—I believe so, judging from what the men tell me. There is a necessity for great care, they say that a very slight interruption might spoil a whole batch of stuff.

567. How is that?—Letting it get over the boiling point.

568. From the point of view of healthiness, alteration of employment would go a long way to mitigate these evils?—Yes.

569. Have you lately seen in the works any men whom you would absolutely suspend if you had the power?—I can only say that it is about 18 months ago since I came to the arrangement that I saw the men every two months, and I had the option to suspend any man. I have not put that option into force.

570-1. You have not met cases so bad that you felt that it would be really necessary to suspend?—No, but within a week of my being there a man has declared himself unfit for work.

572. (Professor Allbutt.) Did you examine that man?—I examined that man. I tried his grasp.

573. Did you think that he was fit for work?—Apparently.

574. You think that his view that he was not fit for work was not a correct one?—You mean on coming up the second time?

575. The first time?—I have seen them there, and have not suspended them. The man referred to was apparently all right. You must be guided by your own impression. You cannot judge from the cyanosis. They have come up afterwards and declared themselves so bad with headache that they could not go on—and shortness of breath.

576. Those are cases you would have suspended?—If I had seen them in that condition. You do not catch cases at all. A man might be practically well when you do see him; and yet be quite unfit for work in a few days afterwards.

577. Where the symptoms are subjective it would be more difficult?—It would be very difficult.

578. Very difficult to say whether a man was pre-

tending?—There are really no physical signs to guide one beyond the cyanosis.

579. The colour of the urine, it is so invariable as to provide a sure index?—Well, the men tell you that it is always dark with them more or less.

580. Would not it be worth while following that up, because if you got some test of that, unless a man took a drug to make his urine dark you would probably detect any imposture; it would be impossible to make a pretence with such a test as that?—Oh, quite so; and, of course, it is impossible to simulate the lividity. It is impossible, taking lividity as a criterion, it is impossible to simulate it.

581. No form of drink you know of, or opium taking, would produce it?—No.

582. Would you call this a dangerous occupation?—I should call it a dangerous occupation, I think. I would not like to work at it myself.

583. Is the pay of these men up to the average of those employed at other works, or is it higher or lower?—I believe it is higher than the average, but I cannot speak definitely.

584. What do you give as a remedy to a man who is overpowered by nitric acid fumes? Is there any general remedy used?—I do not know of any. I have not had any of these cases really.

585. Is there any preventive drug that could be used in di-nitro-benzine factories, like certain drugs that are used in the phosphorus factories, for instance? What are they—permanganates—which are used in the phosphorus factories? Is there any such antidote?—I do not know of any.

586. Some of the ammonium carbonate would be of no use?—I do not think so.

587-8. In the works you can suggest nothing except plenty of fresh air?—I suppose that really is the best. It is the only thing that neutralises it.

589. Have you been in one of the mixing chambers, like the one we saw at Bradford, that we are going to see? They mix anilin oil with acids. Are you acquainted with the process?—Very, very slightly. I have not gone into the process at all.

590. (Dr. Legge.) You have mentioned that there was muscular weakness of the grasp. Have you noticed any definite paralysis in the action of the muscles of the hand?—No, I have not.

591. There is no grooving or wasting?—I have not noticed any.

592. Do they ever complain of weakness of sight?—No, they have not done to me.

593. Have you heard of cases in Huddersfield where there has been a loss of sight?—No, I have not.

Mr. PETER MACGREGOR, L.R.C.P., F.R.C.S., called and examined.

607. (Chairman.) You are a Fellow of the Royal College of Surgeons, and you carry on a private practice here?—I do.

608. And do you hold any appointment?—I am a Surgeon of the Infirmary.

609. And do you attend any of the men on behalf of the employers?—No, but I am an official referee under the Workmen's Compensation Act of 1897.

610. Have you had a certain number of cases as official referee?—Never had one of any kind, sort, or condition, during the whole tenure of my office.

611-2. It is a very barren appointment, then?—I have never had a copper.

613. Have you heard the evidence Dr. McCully has given? I have just come in at the concluding portion of it.

614. During the last six or seven years you have seen a considerable number of di-nitro-benzol poisoning cases, or shall I say nitro-benzine poisoning?—Yes.

615. (Professor Allbutt.) That is at the Infirmary?—Most I have seen privately, and sent them into the hospital afterwards.

616. (Chairman.) Are you in a position to say that the words nitro-benzine have been used advisedly as including both nitro-benzol and di-nitro-benzol? I suppose that is something like carbonate and bi-carbonate of soda?—Practically.

594. Seeing these men every two months, have you fixed upon any particular department which you think more injurious than another—one particular stage in the manufacture?—I cannot say that I have. The men on the stills seem to suffer as much as the men handling the later products.

595. On these stills it has not reached the stage of di-nitro-benzol, it is still in the condition of nitro-benzol, and you consider therefore that nitro-benzol also affects?—The men certainly show signs. The men certainly suffer. The foreman of the shed is repeatedly under my care.

596. And therefore in defining this class of poisoning for the purpose of compensation it would be necessary to give it a wider designation than di-nitro-benzine—nitro derivatives of benzine?—I think that would be sufficient. I do not know anything of the chemistry of that. I know these men on the stills complain repeatedly.

597. There was nothing but plenty of fresh air which modified this?—That has been my experience.

598. Is it not a fact that the men working on these stills are working in the open air?—To a certain extent they are, but the ventilation is anything but efficient. In a trade like this with a foggy, muggy, morning they are, strictly speaking, in the open air, but they might as well be in a closed area.

599. You think these fumes should be taken right away from them?—They always complain most in calm still weather. A breezy day is what they like.

600. Have you satisfied yourself from the examination of these men that the taking of alcohol predisposes them?—I have not. I should not say that. One man, this foreman, is practically a teetotaler, and he seems to suffer as much as the men who do drink.

601. Do you think that there is a class of men susceptible from, say, lack of nourishment, or any other cause?—I should think possibly so. I could not speak from experience.

602. You have not had anything to suggest susceptibility to poison more in one case than another?—No.

603-4. Have you come across dust as a cause?—Yes, there is dust from the breaking up of the solid di-nitro.

605. There are other departments in which dyes are prepared, magenta dyes and all manner of anilin dyes. Have you experience of injury to health arising from them?—I have not. None that could be said to be due to it.

606. If there were any serious cases you would have been called in?—I see the majority of the men, not all of them.

617. The men speak of it as bi-nitro.

618. (Dr. Legge.) That would include also di-nitro-tolual?—

619. (Chairman.) You have also done one post mortem in a case?—Yes, that is Hamilton's case.

620. What are your views of the symptoms of this poisoning?—I will just tell you of a recent case I had, and that explains all the others.

621. That is a representative case?—A representative case—I sent him to the Infirmary on the 1st of September. He was a powerful young Irishman.

622. What was his name?—A. He is well now. He is not in the hospital now. He is a typical case. He got well again, and he could be seen if necessary now. There is another case you can see to-day.

623. Will you please describe his symptoms?—Irish, in perfect health, about 32 years of age, worked at Leitch's for one week—and the way in which I met him—I was riding in the tram going to the Infirmary on a Saturday afternoon, about 5 o'clock. On my way to the Infirmary, and as I passed the end of King Street I saw two men in conversation—a tall one and a small one—and just as I passed I saw the man full-faced—di-nitro poisoning. When I got to the next stopping place I got out and walked back, met this man walking alone. I said "You work at Leitch's or Holliday's?" He said "I work at Leitch's." I said "Are you quite well?" He said "I am very

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Mr. P. MacGregor,
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F.R.C.S.

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ill. I have been asking that man where I could get some Indian brandy." So I said "What is the matter?" He said "I cannot see very well;" and he walked—he staggered. He was quite sober—had nothing to drink and staggered a little, but had the characteristic facial appearance, and had a most frightful headache. It was the appearance which attracted my attention, and the appearance when I have seen them—I have never seen them immediately they have been poisoned—I have seen them within an hour come straight to my surgery—their lips are a dead leaden colour, and the mucous membrane is a very dull leaden colour, the face is a sort of green yellow, a sort of cachectic looking, they are not blue in the face, but pale, and the conjunctival mucous membrane anæmic, some blueness of the nails, but not very pronounced. The pulse is slow, and the arterial tension is low. The urine is high coloured, something like what would happen in obstructed jaundice. All that we do is, we put them to bed, give them milk and soda. We afterwards give them iron and arsenic, but the anæmia persists for a long time. There is evidence of anæmia afterwards, so that I am quite sure it is something which destroys the blood corpuscles. I have followed them five or six weeks; he was very ill for six weeks afterwards—profound anæmia. The paleness goes off in the course of a week or ten days—the curious dull leaden paleness. Once you have seen a case you could never mistake it, and then this profound anæmia follows it, and muscular weakness. This man had been working for a week.

624. (Chairman.) Then the recovery I suppose is due to the gradual growth again of the blood corpuscles, I take it?—Yes.

625. So that this poisoning is accompanied by a disturbance in certain directions, and is very characteristic?—Yes.

626. According to this view it really is impossible for a man to simulate this disease?—Absolutely impossible. There can be no malingering in a case such as I saw from the car in September. I have seen another man, B., a mill operative, and he staggered like a drunken man, and he is a powerful man, and the moment you saw them—

627. The staggering a clever person might simulate?—The staggering is not much.

628. But the high colour of the urine, the other symptoms you mentioned would be impossible to simulate?—The facial expression and the lips it is absolutely impossible, except by nitro poisoning—it is impossible.

629. There is no drug you know of, alcohol or otherwise?—No drug, and he could not stain himself, because the lips have a very deep leaden colour, and through it you see the anæmic gum, and the mucous membrane is very anæmic. There is nothing which can be simulated. I have seen them within the hour.

630. I am going to ask you about the post-mortem—when the man has had treatment under skilful hands, he generally recovers if he is not very bad?—Yes.

631. And Dr. McCully told us—do you agree that in most cases, in all cases, after a sufficient length of proper treatment a man was not the worse?—There is no organic lesion left behind.

632. (Professor Allbutt.) The heart is not affected?—The heart is not affected. The anæmia is due to the destruction of the blood corpuscles.

633. (Chairman.) The great point is that a skilful practitioner can certainly diagnose this. A man—not necessarily skilful—if a man has once seen a case, the veriest tyro in the profession can tell it. There is nothing else like it in medicine?—No.

634. And there is no other poison which produces these peculiar effects?—None. The only poison that produces anything like it is anti-febrin.

635. (Dr. Legge.) That is also a nitro derivative of benzine?—The only condition that I know that produces something like the facial appearance is anti-febrin, but there is a difference, and I will tell you the difference. In anti-febrin there is no cachectic appearance, and there is a general blueness of the whole complexion. The face is altogether blue. The cheeks are blue, cyanosed as you have in congenital heart affection. In anti-febrin you have first of all blueness, general blueness. You have not the peculiar condition of the urine, and you have not the peculiar pallor of the face, a pallor that is sallow, a cachectic pallor that is characteristic, as the blueness of the lips—you have none of

these things, no pallor, and the patient feels quite well when you give him anti-febrin in doses to cause even poisoning symptoms. There is an old gentleman who used to experiment on himself.

636. (Professor Allbutt.) The cyanosis due to anti-febrin is distinct from that due to the nitro compounds, the benzine compounds, totally different in nature and in symptoms?—Yes.

637. (Chairman.) I think that finishes the general evidence of this poisoning?—It is absolutely characteristic.

638. You made a post-mortem. Have you anything to say with regard to what you found?—I found a man of 50, of splendid physique, all his organs absolutely healthy, the blood was abnormally dark and fluid in both chambers of the heart and in all the large vessels.

639. Did he die in hospital?—No. He died in about 48 hours from heart failure.

640. How is it known that this heart failure was due to this poisoning instead of some other cause?—The poisoning was diagnosed during life. He came home from the works with characteristic symptoms of di-nitro poisoning, and he was attended by a competent medical man.

641. And therefore you would be able to say for certain that that heart failure was due to this poisoning and not some other cause?—Due to nothing else.

642. (Professor Allbutt.) The fibre of the heart was normal?—Yes. A man of fine physique, all his organs perfectly healthy—an abstemious, temperate man of splendid physique.

643. Was he exposed in any special way?—I have never been inside the works, so I was never in a position to speak. Men have told me that in cleaning out the "egg"—that is their expression, a sort of vat—it has always come on.

644. (Chairman.) In this case, in the post-mortem case, was the condition of the blood characteristic—was it different from what you would expect in a man who died of heart failure?—It was the only post-mortem, but it was different from any other post-mortem.

645. The man who died of heart failure in the ordinary way would not have his blood in this condition?—No.

646. There was nothing in the urine still in the man?—That I am afraid we did not examine.

647. Is there anything else you desire to add with regard to that post-mortem case?—Nothing.

648. But cases have been rare—increasingly frequent, I believe, though?—Yes.

649. Since the commencement of the Boer War?—Since that time.

650. Why—can you give any reason?—I cannot give you any reason at all. I have always seen cases at intervals for the last 15 or 16 years. There are two works, the large works I have very rarely seen cases from, Read Holliday's, I have seen one or two, but very rarely. They have a club of their own, and they have a competent medical man. I think Dr. McCully sees all their cases. We rarely have them at the infirmary.

651. Since the period of the commencement of the Boer War?—I do not think there is any connection. Five or six years.

652. Has there been any new process of making anilin brought in?—No, I do not think there is.

653. Perhaps we can find that afterwards?—There is a case in the hospital to-day. I have had four or five cases this summer, and they all came from Leitch's.

654. They generally occur in a short period after the man commences the employment?—That has been so in the cases I have seen.

655. Does that point to idiosyncrasy of individuals, rather than some men stand it and others do not?—I think it rather points to the fact that the men who have been there some time get more careful.

656. (Professor Allbutt.) They do not establish a tolerance?—I think the man who is very ill to-day has been working since April.

657. (Chairman.) From two weeks to six weeks was the usual period of treatment to get a man right?—Yes, up to six weeks. A good deal depends upon the men, but I am quite sure that they are not quite well under six weeks.

658. Do you give them carbonate of ammonium?—I put them to bed, give them nothing—put them to bed, and give them plenty of milk. If I did actually treat, I should treat with oxygen. If I saw a bad case I should treat with oxygen and strychnine, hypodermic administrations of strychnine. In the larger works cases occur, but they are rarer than in the small works. I attribute that to better ventilation, better management, and other causes. The men there are a better stamp of men, and they have a good club and a doctor who looks after them. In the smaller works the men belong to casual labour, and I do not think they are as well looked after for this reason. If at Read Hollday's he is ill, the club has to pay; in these other cases the employer denies all liability, and will not give a penny.

659. Do you think the matter is sufficiently grave to warrant insistence on a periodic examination of these men?—I do not think it would make any difference, because the symptoms come on quite suddenly. What I should like to suggest is that surprise visits should be made, that the precautions which are recommended are carried out efficiently.

660. You would like a strengthening in the rigidity of these recommendations, the recommendations turned into orders?—That is my opinion. It ought to be compulsory, compulsory as the whole of the Factory Acts are as to fencing machinery, because it is more dangerous than unfenced machinery.

661. What precautions would you recommend the workers to take?—I think that the men ought to be compelled to wear rubber boots, such as sailors wear, and gloves. I would have them made of rubber because rubber is a non-conductor of the fumes.

662. (Professor Allbutt.) Why, for what end?—It is absorbed by the skin. People have been poisoned by anilin dye from the dye from the boots.

663. (Chairman.) And your impression is that they absorb it through the skin?—Yes.

664. You are clear that, like anilin, nitro-benzines are absorbed through the skin?—Quite confident of that.

665. If a man dipped his hands constantly in and kept them wet with this material, it would go right through the skin and produce general symptoms?—I have not the slightest doubt.

666. Would the wearing of indiarubber gloves constantly injure the health?—Not if they are open at the top. Large gauntlets and boots coming over the knee—sailors wear them, I have worn them myself for months.

667. Yes, they have been impregnated with grease and dubbing?—I think the rubber would be better than the leather, because it is a better non-conductor.

668. The men object to use these rubber gloves; that is a very stupid thing?—Yes.

669. Just as the stonemasons object to wear masks?—Yes.

670. Is there any other point that we have not asked you on with regard to this nitro-benzol poisoning?—I do not think so.

671. I think I have dealt with all the points referred to in your *précis* of evidence?—Yes. I think I ought to add that I have communicated with the inspector of factories, and have felt that something ought to be done, and the only way that anything can be done is by compulsion.

672. (Professor Allbutt.) Especially in the way of ventilation and boots?—And everything that experience and science tells us is for the safety of the workmen, just as in factories you compel the fencing so far as it can be done. How far that is feasible and possible I do not know.

673. I should like to point out to you that you have introduced a new point in the absorption of the poison through the skin. I do not think that we heard anything about that at Bradford.

(Chairman.) Yes, I think so. The workmen were told to wash it off, because it would be absorbed.

674. (Professor Allbutt.) Do you think the fumes play any part?—They are absorbed both through the breath and the skin; worse through the skin than any other form. If you give a mercurial bath it is most penetrating.

675. A man's boots and stockings get soaked?—A man's clothing generally with the fumes, and then he absorbs it by a process of inhalation. It is volatile, and supposing his clothes are saturated, he at the same time inspires through the respiratory organs.

676. It is absorption from both surfaces?—Take iodine; if you apply iodine to the skin it is most difficult to get rid of.

677. Are you quite sure that the odours come under the same category as the material drug, the material poison?—It is absorbed through the skin, that I am quite sure of.

678-9. (Chairman.) There is here in this district a certain amount of clearly preventable di-nitro-benzol poisoning going on?—That is my opinion.

680. The conclusions we can easily draw from that general opinion?—Yes.

681. (Dr. Legge.) Your remarks as to persons getting tolerant to the effect of nitro derivations of benzine in a factory is said without knowledge of the different processes that go on there, and without knowledge of the interior of the factory?—I have no knowledge whatever.

682. Some men do remain at the work year after year without illness, and, again, you get men who are affected in a week, as you said. That is said without knowledge?—No inside knowledge.

683. (Chairman.) There is a distinct impression that there is an idiosyncrasy. You have no opinion to offer one way or another?—Most of the men I have seen have been men who have been employed a week, or about a week.

684. That is quite consistent with the idiosyncrasy theory?—Yes—typhoid fever and everything. I am quite sure that the question of temperance has nothing to do with it, that alcohol has no bearing. Some of the men I have seen have been perfectly temperate, healthy men.

685. (Dr. Legge.) If you found that those men who were alcoholic suffered more than the others it would upset —?—If a man is obviously alcoholic his resisting power is very much less, but on a man who, like myself, is neither drunkard nor teetotaler, it has no effect. He is just as safe as a teetotaler or as unsafe.

686. Why do you give milk in these cases? I have never heard of a rational explanation?—I do not think I can give you one. The only reason I give milk is I want to give them food, and one that is most easily absorbed and least irritating, because I always thought the probabilities were that the intestinal mucous membrane would be in an exactly similar condition to that of the mouth and nostrils and lips.

687. You give it as something soothing to the mucous membrane, and nourishing?—Yes.

688. And not as an antidote?—No, the only antidote I should give in a bad case would be oxygen, because I conclude that the oxygen carrying power of the blood corpuscles is destroyed. The nitro-benzol poisoning, of which I have been speaking, I should regard as a more dangerous class of poisoning than the poisoning of the amido compounds of benzol.

689. (Chairman.) You have had, I think, some experience of men who have been rendered ill in the occupation of stone dressing work?—I have had a good deal.

690. What are the characteristic symptoms of the men ill with that?—Well, usually, you have a history of his occupation to begin with, then you have a history of bronchitis extending over a long series of years. Then when you come to examine him you find both lungs practically alike—the one is not in a more advanced stage than the other. In the early stages you simply find the symptoms are bronchitis with tendency to bronchiectasis. There is no rise of temperature in the early symptoms, and the man does not appear to be very ill, he simply complains of a cough.

691. (Professor Allbutt.) Is the bodily temperature affected?—There is no rise of temperature. He is following his occupation, and there is no rise of temperature. In tubercle you always have one lung in a more advanced stage than the other. In chronic tubercular cases you have always definite consolidation at some portion, usually the apex, whereas in fibrosis

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of the lungs due to stone dressing the base is always most affected.

692. (*Professor Allbutt.*) And definitely periodic?—More pronounced the first thing in the morning.

693. (*Chairman.*) And that distinguishes it from pulmonary consumption?—In early tubercle you have a short cough with very scanty expectoration, and an evening rise of temperature. In the mechanical consumption due to stone you have in the early stages a rather aggressive cough, a big cough. You have a large amount of frothy expectoration, and you have no temperature in the evening or at any other time.

694. (*Dr. Legge.*) Would you like to add to this any statement with regard to hæmoptysis and night sweats?—In tubercle you frequently have some spitting of blood in the early stages. You have night sweats, and in the mechanical consumption you have neither.

695. (*Chairman.*) Is there any difference in the two beyond in the stuff that is coughed up—the expectoration of the material?—You can get the tubercle bacillus in the one and not in the other.

696. That would be to me almost conclusive?

697. (*Professor Allbutt.*) It is very apt to get engrafted?—There is a point of least resistance, and you are very apt to get it later on.

698. (*Professor Allbutt.*) The existence of a damaged area is most important.

699. (*Chairman.*) In some stages, by a microscope, the difference between mechanical phthisis and the tubercular phthisis can be established clearly apart altogether from clinical matters. There is an absolute test?—Yes, there is an absolute test.

700. In a post-mortem examination of a man who has died from one or the other are there characteristic

differences?—There are. But you might easily get into difficulties if the case were a chronic one of tubercle superimposed on to case of stoneworker's phthisis, because you would get ulceration of both from the action of the pus. I think I could tell if I had two lungs on the table, one of a case of death from tubercle phthisis and the other from mechanical phthisis. I think I could distinguish them.

701. (*Professor Allbutt.*) Two pairs of lungs I think there ought to be?—Yes.

702-3. In pulmonary disease due to steel dust, under the microscope that is discoverable?—Yes.

704. Is that the case in stone?—No, it is not always.

705. (*Chairman.*) You do not happen to be able to answer with regard to quartz dust?—No, I do not.

706. One would think quartz was difficult to deal with?—They have ganister works near Sheffield. There is also in that town the steel grinders' phthisis. Here I have had no experience of the diseases.

707. With regard to steel dust, I think that gets embedded in the tissue and is very difficult to eradicate. The stone dust even of the harder qualities, and possibly even when amounting to sandstone, gets washed away?—Yes, it gets washed away by the copious expectoration to a greater extent.

708. That at least is the way I would account for the apparent fact that you do not see at post-mortems more stone grit in the lungs?—Yes.

709. (*Professor Allbutt.*) That means that they are more curable?—More curable. I think they are quite curable if you get them sufficiently early.

710. (*Chairman.*) And probably more curable than the steel?—Yes.

Mr. J. L. PARKE, M.D., called and examined, at the works of John W. Leitch and Co.

Mr J. L.
Parke, M.D.

711. (*Chairman.*) We are desirous of obtaining from you some general evidence as to the effect upon the men here of working in di-nitro-benzol. How long have you been in this district, Dr. Parke?—22 years.

712. How long have you been certifying surgeon?—About 12 years.

713. Have you seen cases of poisoning by either "nitro-benzol" or "di-nitro-benzol"?—Yes, many cases.

714. You inspect the men here every now and then?—Every fortnight.

715. That is due to the employers, who have asked you to do that?—Yes.

716. That is not a statutory duty?—No.

717. It is merely what they have asked you to undertake?—Yes.

718. And do you record in a book the result of your observations from time to time?—Yes.

719. Would you please describe to us the symptoms that you would expect to find in a case of "nitro-benzol" poisoning?—The principal symptoms are the pallor of the face.

720. A pallor that is distinguishable from other sorts of pallor?—Yes; I was going to say rather of a yellowish cast.

721. Is the pallor so specific as to enable you to say definitely, if you saw a man affected with it, and knew that he had been in contact with "nitro-benzol," "That man is suffering from 'nitro-benzol' poisoning"?—Yes.

722. If the pallor had been due to drunken habits you would be able to distinguish that kind of pallor from a pallor due to "nitro-benzol" poisoning?—Yes.

723. What is the other symptom?—The lips are very livid.

724. Is that again rather characteristic?—Yes.

725. What else do you find?—There is nothing perceptible beyond.

726. You mean, I suppose, nothing perceptible to the eye. Do the men complain of headache?—There is one thing common, there is a slight yellowness.

727. A jaundicy look about the whites of the eyes?—Yes.

728. Now, I will take a series of symptoms for the truth of which you have to depend upon what the men say—is there headache complained of?—Yes.

729. Do they complain of a gassy feeling in the head?—Yes.

730-1. And dizziness?—Yes.

732. Have you noticed a tremor of the hand, and nervous failing too?—Yes.

733. That is complained of?—I always examine the men every fortnight.

734. Is not that a thing that a man can simulate?—Yes.

735. But he could not deceive you from the lips and the face?—No.

736. It is said that the urine becomes darker in the case of men suffering from nitro-benzol poisoning—have you had an opportunity of observing that?—I have not.

737. I suppose that arises from the fact that you have not treated them clinically?—Most of them reside away from here, and in the acute cases I do not see them.

738. The urine is a thing that the doctor attending them would know better about than you?—I have never had a case in hand.

739. You feel clear that a man who is well instructed could never well mistake a case of nitro-benzol poisoning?—No, it is very clearly marked.

740. What are the cures?—I have generally advised them to stop away from their work, and I have usually given them purgatives acting on the liver.

741. On the liver?

742. (*Professor Allbutt.*) Is constipation a feature?—Yes.

743. (*Chairman.*) You have had men rather seriously affected with it?—No, I have not had them in the very acute cases.

744. You have not tried oxygen in any case?—No.

745. Might I suppose you have not had cases bad enough for that?—I have not.

746. And beyond that you have not given them any special medicine, have you?—No. I have tried iodide of potash.

747. But you would recommend nourishment, milk or things of that sort?—Yes.

748. And abstinence from alcohol while they are getting well?—Yes.

749. Now in your opinion might not a good deal of this poisoning be stopped if greater care were taken?—Yes.

750. We have had evidence from most people that a good deal of this is really preventable?—That is my impression.

751. What are the means that you would suggest to prevent it, speaking as generally as you can?—Well, I thought it would be a very good thing if the men had to wear respirators.

752. The only thing about that is that a respirator—one of these aluminium and cotton respirators—is rather awkward for a man to wear, especially in summer? There is that against it?—Yes.

753. Another form of respirator would possibly be enough for this trade, and that is a cloth tied round the face and coming up close under the eyes?—That would be quite sufficient.

754. That would be quite sufficient. That would keep the crystals, the powder crystals, from getting on to the face, and any acids?—Yes.

755. But it would not stop fumes, of course?—No.

756. Is there anything else you would suggest?—I think they ought to wear very good boots.

757. That arises from the fact that this poison is absorbed?—It is absorbed by the skin from the outside.

758. You have no doubt?—Not the slightest.

759. And that is generally recognised to be the fact? No good medical man would dream of disputing that you can absorb "di-nitro-benzol" through the skin from the outside?—I should think not.

760. And you would like to see them wear boots with thick wooden soles, and a sort of leather upper?—Yes.

761. The men use boots here—wooden soles with leather uppers?—Yes.

762. Now as to gloves. Would you say anything with regard to that: gloves are very useful, but yet the men object to wear them?—They will object to wear the boots, too.

763. Why should they object to wear the boots?—I do not know, but they do not bother about wearing them.

764. And I suppose one might partly say that when they are poisoned it is in some respect due to their not having a very good stamina to start with?—Yes, they sometimes eat the stuff.

765. They eat it?—They take and eat their food straight away with their hands covered with this stuff.

766. (*Professor Allbutt.*) They eat their food off the barrel?—Yes. They eat their food without washing their hands. They eat their food while at work, without washing their hands.

767. Then you would be rather glad to see a rule absolutely to forbid them to eat their food in the place where they are working with "nitro-benzol"?—Yes.

768. And would it not be possible to put up a shed or some place where these men could have their meals?

(*Mr. Leitch.*) We have a dining room.

(*Chairman.*) In this factory there is a separate dining-room, and yet the men do not eat their food in it?—Yes, but they do not wash their hands before eating.

769. And that you consider indispensable; and there are basins here, too?—Yes, everything is provided for them.

770. Is there no precaution—no other precaution you think might be taken by the men?—The men who have worked in the cotton factories cannot stand this work. I do not know why it is—whether their skins are more susceptible—they cannot work a day in it.

771. Are the cotton factories hot and humid factories?—I expect so. They are humid and hot.

772. And is it humidity and heat that has to do with rendering the skin in a state susceptible to the poison?—We have occasionally had one or two men who stated that they have been in a cotton factory, and I have

noticed that they could not stand the work. I would not pass a man who I knew had been in a cotton factory. *Mr. J. L. Parke, M.D.*

773. (*Professor Allbutt.*) What other industries are there besides cotton and chemical?—The woollen manufactures. 2 Nov. 1906.

774. Would a man from the woollen manufacture be less liable?—I have not noticed a case.

775. (*Chairman.*) Now, are there any precautions which should be taken by the employers in the construction of the apparatus. I will put that to you one after the other—greater ventilation?—No. I think there is everything here in that respect.

776. In the way of ventilation?—Yes.

777. At all events, one thing is quite plain, is it not, without passing an opinion on any particular works—thorough ventilation is a great improvement in this trade?—Yes, certainly.

778. Then do you think it would be a good thing to have a periodical medical inspection of the men? Would it be fair to require it to be done in all firms in the country; desirable in the interests of the men?—It is very desirable.

779. You consider a regular medical inspection to be a good thing?—We have stopped a lot of it.

780. Would you consider it right that it should be made a rule that a man who felt ill should be obliged to report it to you or the management?—Yes.

781. That rule, does it not obtain here?—I have to do that here every week.

782. Would it aid you if they had to obey it, and it it was made a rule?—Yes.

783. (*Professor Allbutt.*) I think you are in agreement with other observers, that by such complete removal from the works as you are speaking of, not specially by fresh air, but merely by removal from the works, these cases are practically all recoverable?—Yes.

784. Have you ever seen a fatal case?—No, I have not.

785. Have you seen people in any great danger, apparent danger?—No.

786. They would recover in five or six weeks?—Yes, in the majority of cases in a fortnight.

787. You laid a great stress upon what I call dirty hands, the lack of a certain special cleanliness in those who are continually handling these things?—Yes.

788. That would account for perhaps a majority of cases?—Yes.

789. In fact, it is difficult to eliminate it from all the cases?—Yes.

790. Because if we go on to the matter of absorption into the skin, either from the clothing or by any other way than by putting it into the mouth, we leave facts for impressions rather. You cannot say that you could eliminate the poisoning from the fingers in any case?—No.

791. As to better ventilation, I am sure both employers and employed are agreed. But in what special way would ventilation act? Would it carry away any fumes or any vapours of a more volatile kind, which might add to the poisoning from dirty hands? Have you observed any poisoning by more volatile matter?—No, I have not.

792. Then ventilation is good for this only as it is for other businesses?—Exactly.

793. (*Dr. Legge.*) There is one symptom you refer to in every one of the reports you have made on cases of this form of poisoning which you did not mention—that is, loss of sensation in the feet?—I had no question drawing my attention to it.

794. That is, you think, one of the earliest symptoms?—Yes.

795. Have you ever followed that up and seen whether there is any definite loss of sensation?—Yes.

796. And is there?—Yes.

797. And when you said that it was so important for them to wear very good boots, do you think there is any connection between the two?—Yes, certainly.

799. Then have you been able from your examination of the men to single out any particular process that injures the men?—No, it is very fine. I could not say that I have.

800. You have been round the factory, and you know

Mr. J. L. Parke, M.D.
2 Nov. 1906. where the different men work?—Yes. I may say that the men breaking the material up seem to suffer the most—just with breaking it up.

801. Then they are not exposed to fumes?—No.

802. Nor to handling it?—No.

803. Is there dust at that point?—Yes.

804. Have you noticed any dust on the clothes of the men?—No, it is very fine. I could not say that I have.

805. With regard to the cotton operatives, who you say are bad subjects, you have not inquired as to the precise point in the factory where they have been at work?—No, I have not.

FOURTH DAY.

Friday, 9th November 1906.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. R. R. BANNATYNE (*Acting Secretary*).

Mr. LEONARD HILL, M.B., F.R.S., called in, and Examined.

Mr. L. Hill, M.B., F.R.S.
9 Nov. 1906. 806. (*Chairman*.) You have had considerable experience in caisson disease?—Yes, I have worked at it for about eight years.

807. And caissons, I suppose, are increasingly used in engineering?—Yes; there have been about a dozen large works in England since 1890 in which they have been used.

808. Have you any statistics of the number of cases of this disease which have been recorded?—Well, I have got here a book which gives the number of deaths which have been recorded, but not the total number of cases of illness; but from the number of deaths one could get an idea as to the proportion of cases of illness there must have been.

809. What book is that?—It is a book on the subject by Von Schrötter, who has worked a good deal on this disease in Vienna.

810. Does it refer to the number of deaths in England?—Yes, he has tabulated here all the chief works (caisson works) up to 1890 that have been constructed in all countries. He has written to the officials of all countries and collected all the evidence he possibly could.

811. And could you tell us how many deaths he attributes to this disease in this country in recent years?—In this country?

812. Yes?—The deaths have not been very numerous, fortunately. There was one at Saltash, in Cornwall.

813. In what year?—In 1856 to 1859, at the Royal Albert Bridge, built by Brunel; four cases of death at Londonderry, in Ireland, in 1859; at Glasgow (tunnel under the Clyde) one or two deaths, and there has been one recently at Newcastle.

814. So that deaths are comparatively infrequent?—Deaths are infrequent in this country owing to the comparatively shallow depths at which the works hitherto have been carried out. In 1890 von Schrötter tabulated 137 cases of death collected from all countries.

815. But cases of the disease are far more numerous?—Far more numerous. At Blackwall Tunnel, for example, there were 200 cases—minor and more or less severe cases. Then, at the St. Louis Bridge, in America (one can get the proportions here of the cases of death to illness when a high pressure is used) there were 14 deaths and 119 cases of illness among 352 workers. That is the tunnel at which the highest pressure ever used was employed.

816. When was that?—It was built between 1869 and 1874. In New York (I am told) there have been about 18 cases of death—something like that—in the last year or so; Messrs. Pearson and Company are building a tunnel, and I believe they were censured (by a

coroner's jury) over the large number of cases of death that occurred there.

817. When do the chief symptoms appear—after the men come out from the caisson?—Always after coming out.

818. And to what is the illness attributed now by medical authorities?—All those who have worked at this illness experimentally are convinced and agreed that it is entirely due to the setting free of nitrogen bubbles in the blood and tissue fluids of the body. Under the compressed air the body dissolves an excess of air, the oxygen gas in this air is of no importance, because that is combined chemically with the tissues, whereas the nitrogen is not chemically combined. On coming out rapidly from compressed air this nitrogen gas is set free in the blood and tissue fluids.

819. You say "rapidly." If the pressure is gradually relaxed then the danger is proportionately lessened?—Entirely so. The dissolved gas then is given off from the lungs.

820. So that the disease is quite preventable, if proper precautions are taken?—Quite.

821. The precautions being that the interval between the subjection of the man to the maximum pressure and his emergence into the ordinary air should be sufficiently long?—Quite so.

822. You yourself, I believe, have made experiments in this direction?—Yes, I have been experimenting, as I have said, for eight years, first upon animals, then upon myself; my co-worker, Mr. Greenwood, has also experimented upon himself.

823. And you have found that, with proper precautions, it was possible to be exposed to a very great pressure without danger?—Quite. We have been under considerable pressures—Mr. Greenwood's pressure of 92 lbs., I do not think, has ever been excelled—it is deeper than the deepest pressures under which divers have ever done work; only one or two divers have ever been to these great depths (they have been divers seeking for treasure in wrecks) and accidents have been frequent among them. There are, I believe, 10 fatal cases a year amongst sponge divers off the island of Hydra, who dive to about 40 to 45 metres.

824. Do persons vary in the degree of susceptibility to this illness?—Yes, they do; one of the most remarkable things is that young animals are very immune to it; for instance, if we decompress an old rabbit and some young rabbits, two or three weeks old—decompress them rapidly from eight atmospheres—the old one would be almost certain to die; but the young ones generally escape. We have decompressed young animals from eight atmospheres in as short a time as four seconds, and the young animals have survived in most cases. There seems to be a very great

immunity in the case of very young animals. The statistics seem to show that young men escape from caisson trouble to a very large extent.

825. Is it possible to differentiate caisson illness from other illnesses?—Well, you see, caisson illness is produced by bubbles occurring in the blood, and these bubbles may block up any vessel in any part of the body; if they occur in the muscles or joints they cause violent pains, which are called "bends" by the workmen; if they occur in the heart in sufficient amount, they may stop the action of the heart and produce instant death; if they occur in the central nervous system, they may cause paralysis; and the paralysis may be of the most varying kinds, according to the places where the bubbles occur. A bubble may occur in the central artery of the retina of the eye and produce blindness; it may occur in the internal labyrinth of the ear and produce noise in the head and vertigo; it may occur in the great brain and produce hemiplegia; or it may occur in the spinal cord and produce paraplegia, so that the symptoms are extremely various.

826. Then, if you saw one of these cases and did not know that the man had been engaged in this particular employment, you would not be able to say, necessarily, that his illness was caisson illness?—No, you could not possibly.

827. But if you knew that he had been employed in a caisson, his condition you would know was almost certainly due to that employment?—If his symptoms came on after decompression in the right period of time, and the symptoms agreed with some of the known results that one gets experimentally, or which have been observed in caisson workers, one would be able to arrive at the conclusion that it was a case of caisson disease; but it seems to me to be a thing which allows malingering to take place.

828. Why?—Malingering would be very easy. I mean if a man once read up "caisson disease" he could imitate certain caisson troubles and demand compensation. I had before me the case of a man who came to see me a little while ago from the Rotherhithe Tunnel, where they are using compressed air. This man, I think, was a malingerer. He had made his symptoms come on while in the tunnel under the compressed air, instead of after decompression. Cases of caisson illness coming on in the compressed air are practically unknown.

829. What were the symptoms in that case?—He had severe pains in his head, pains of neuralgic type, which might have been produced by bubbles quite well, because pain is one of the chief symptoms that caisson workers have. This man had his headache come on in the tunnel. It struck him "all of a heap," he said, and left him unable to work. I think, therefore, this man was a malingerer.

830. Do the symptoms usually come on suddenly, or do they develop gradually?—Oh, they generally come on suddenly. A man is seized with sudden pain, or with paralysis, or falls unconscious.

831. Is that immediately after emerging?—No, it may be at any time up to half an hour, or even longer; because the bubbles, once set free in the blood, may linger about in some unimportant place—in some of the veins, for example, in the abdomen—and then, by the movements of the man they may be dislodged and work their way round into the heart and set up trouble there or get into the spinal cord or some other place of great import. I think in all caisson works the men frequently must have bubbles inside their blood vessels, but the bubbles do not happen in most cases to get into places where they do any mischief.

832. Do you ever get symptoms gradually increasing?—Yes, certainly; in the case of "bends," the pain may get more and more severe. So, too, paralysis may get more and more complete.

833. Would you ever have a case of a man who had been employed in this kind of work and who, after leaving work, felt rather unwell, and got more and more unwell over a period of days, and ultimately got very ill indeed?—No; that would be entirely unlike caisson disease.

834. Then really this disease is in the nature of an accident?—Yes, it is a mechanical lesion produced by the appearance of the bubbles, the bubbles either blocking up the vessels and producing a complete anæmia of the part which is supplied by the blood vessels, or the bubbles actually tearing the tissues.

835. But would you say that you get a comparatively mild symptom at first and then later on more serious symptoms?—Yes, but that would always occur within a short space of time; it never would occur gradually in the course of days; I mean, you could not have mild symptoms one day and then be stricken the day after with severe symptoms.

836. It would always be a question of hours?—It would always be a question of hours.

837. At the most?—Yes, I think so, certainly; if the bubbles get into the central nervous system they will produce their results within a few hours.

838. Do you think the disease can be diagnosed with sufficient certainty to make it a proper subject of compensation from the employers, or do you think that malingering would be so easy that it would be unjust to make the employers of the workmen pay compensation in such cases?—If the decompression period was regulated the whole thing would be settled in quite a different way, and a much better way.

839. But that is not within the competence of this Committee to investigate. We cannot deal with prevention, nor even with cure, but only with compensation?—Well, the malingering would not occur unless it were among men who are acute enough to "get it up." There are such men—men who would read up the whole subject.

840. But it would not be easy to imitate the symptoms?—Oh, no, not at all; it would be very difficult; it would be extremely difficult to imitate paralysis.

841. But the milder symptoms, for instance, neuralgic pains?—They could be imitated, but then they are not lasting; a workman could not claim any great compensation for those pains.

842. He would not be ill for a fortnight, for instance?—Not as a rule; they are not lasting. The only minor cases that are lasting are, I think, the ear troubles. Most of the minor cases of ear trouble are produced by non-equalisation of the pressure, on either side of the drum of the ear, during compression. A workman suffering from catarrh of the throat, and who cannot easily open his Eustachian tubes, should not go into compressed air.

843. Suppose the term "caisson disease" were put into the third schedule of the Workmen's Compensation Bill, would its significance be universally understood?—Yes, I think so.

844. Is there any term, such as "compressed-air illness," which would describe it better?—Yes, I think, on the whole, that "compressed-air illness" is a better term. A "caisson" does not really necessarily mean the employment of compressed air; you can have a caisson without compressed air being used.

845. And you could have compressed air, of course, without a caisson?—You could have compressed air without a caisson, so that I think "compressed-air illness" is the better term, but in the medical writings "caisson sickness" or "caisson illness" is the term which is generally employed.

846. But if the term "compressed air illness" were used in a Statute, there would be no danger of its being misunderstood?—No, none at all.

847. In any way?—No.

848. (*Professor Albutt.*) I may ask you, Dr. Leonard Hill, about contingent conditions. You spoke of individual susceptibility as illustrated by animals. Are there contingent conditions, such as alcohol, for example, or other contingencies in the individual, which may determine the greater liability?—No, I do not think there is any clear evidence of any other condition except youth that I know of. I should, myself, recommend that no man should be employed who was of gross, or heavy build—the smaller and more muscular, and the thinner the body, the better—I mean there is less tissue fluid to take up the dissolved gas. Small animals, I might say, are comparatively immune compared to big animals—even an old small animal—I mean a mouse or a rat—will stand decompression much better than a bigger animal, a cat or a dog.

849. Within the human body itself—within the individual—symptoms do not always take the same order; there may be in one man an air bubble in a muscle, in another in the central nervous system, and so on?—Yes, that is purely a matter of chance, I think—just where the bubbles happen to get. In

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divers you very rarely get "bends," and in caisson workers, "bends" are extremely common. I take it that that is due to the extremely heavy muscular work that the caisson worker does which determines the supply of blood to the muscles and the joints. The diver does not do such heavy work under water.

850. As regards malingering, the symptoms of the malingering could only be subjective symptoms, could they?—Yes.

851. That is, those which cannot be the subject of direct observation; and those are of the least importance?—Yes—quite.

852. And in any case, transient?—Quite so.

853. I might just press one point a little further. There is no experience of bubbles doing a latent harm, or some slight injury to nervous centres, for example, which, later, at some indefinite subsequent period, might possibly have degenerative effects?—No, I have no evidence of any such after effects. There is one point I should like to mention—it was not put down in my notes; that is, in regard to the ventilation of caisson works; that is a thing I forgot to put down, but it is of importance, because in tunnel works, carbon monoxide may be set free, and you may get carbon monoxide poisoning contributing to the development of caisson disease. If a man has got his blood partly poisoned with carbon monoxide, he will be all right while he is in the tunnel under the compressed air, but when he comes out—when he is decompressed—he may fall unconscious, because the amount of oxygen in his blood at the normal atmospheric pressure would not be sufficient to maintain his needs, owing to carbon monoxide poisoning. I am not at all sure that some of the cases, especially the 18 cases that have occurred in New York, have not been due to this carbon monoxide poisoning.

854. That means, does it not, that persons employed in these trades, in your opinion, would be liable to two kinds of evil influences—the carbonic monoxide and the compression?—Yes.

855. They may be more or less mixed?—That may be so. It is a question of ventilation; if the caissons are properly ventilated there will not be the danger of carbon monoxide being a contributing cause.

856. But in either case the effects would be immediate. They would occur within hours in either case?—Yes, they would occur in a "shift," and they are due to the compressed air really.

857. It would make no difference in the date of the "on-come"?—No.

858. (Mr. Cunynghame.) Is there any written description or diagnosis of this disease that would be useful to medical practitioners in diagnosing it?—A great many of these cases have been recorded now—fully recorded.

859. Can you indicate to the Committee any source from which a good description could be got of the disease—a description of all the symptoms that would be understood by medical practitioners?—You can only read up the cases, because every case varies almost.

860. Could not you indicate to the Committee some documents from which that could be got hold of?—Yes. The two great books on the subject are first the book "La Pression Barométrique," by Paul Bert (who first of all established on animals, that bubbling was the cause of disease), and secondly, this book of Von Schrötter's "Luftdruck Erkrankungen." Bert's is a French book, this is a German book, and neither of them have been translated, but one could easily collect a series of cases, or put a series of cases together.

861. Something could be done in that direction?—Yes; that could easily be done. The information is all in these. E. H. Snell has recorded the Blackwall cases pretty fully in a book that he wrote—"Compressed Air Illness."

862. In your view, apparently, where you were satisfied that there was an efficient slow decompression room and that it had been properly used, and where the men did not exhibit paralysis, you would be very much inclined to put down the symptoms to malingering, would not you?—Yes; if the proper decompression period had been given.

863. Where the employers used a really efficient decompression room it is extremely improbable that a medical practitioner—or, if there was an appeal—the referee would find the disease as a fact unless some

paralysis occurred that they could really identify?—Yes.

864. I mean this, that mere complaints of headache or nervous feeling in a man who had come out of a really efficient decompression room would be subjects of the greatest suspicion?—Yes, quite so.

865. And the only permanent effects of caisson sickness, I understood you to say, are deafness?—Paralysis and deafness.

866. Paralysis and deafness. How long might the paralysis last?—It may last until the person's death, or it may kill him at the end of some months.

867. It may last from the beginning of it to the end of a considerably long life?—Yes.

868. How long might the deafness last?—That might last the rest of the life too; deafness and dizziness. Vertigo is a symptom, which is very troublesome.

869. Those, however, are the only two permanent effects, are they?—Yes; as far as I know those are the only two permanent effects. You might have a case like that one, I mentioned, of blindness, owing to a bubble getting into the eye. There has been a case of that kind.

870. What you are saying with regard to these cases would be found described in the treatises to which you have alluded?—Yes.

871. The object of my asking these questions is to get some help for the doctors, so that they may know where they can obtain a description of the disease?—Yes, quite.

872. Then the place where the nitrogen is dissolved in the blood is the lungs, I suppose?—Yes.

873. It struck me that it is possible that some carbonic acid might be absorbed into the blood too at the same time; is that ever the case?—If there is ever an excess of carbonic acid?

874. I mean the carbonic acid formed by breathing?—No.

875. That would be impossible, would it?—Yes.

876. I ask in my ignorance. You say: "No." So that it would be nitrogen only that you would have to cope with and no other gas?—Yes; a considerable deal has been made out of carbonic acid by Mr. Moir, the engineer; and Snell paid considerable attention to that also; but I am perfectly convinced—and all experimental workers on this subject are convinced—that carbonic acid has nothing whatever to do with it.

877. What explosives will give rise to carbon monoxide in any material quantity?—Any incomplete combustion gives rise to carbon monoxide, I think.

878. I know that several very dangerous poisons are formed by certain of the explosives?—Yes.

879. But I thought it was only gunpowder—perhaps I am wrong in that—or perhaps you do not know?—No. I should not like to go into that point.

880. I thought it was only gunpowder that formed carbon monoxide—that it would be difficult to get it from anything except gunpowder, and that the high explosives—although they form dangerous compounds—do not form that?—Yes.

881. But you have not made any analysis, have you, that would enable you to answer any question as to that?—No, I cannot. We are just going to work on that subject now. Of course, when I say "carbon monoxide," I should like to include any other gas which acts in the same way as a poison. Mr. Moir has suggested to me that carbon monoxide may be produced by using low-flash oils as lubricants in the air compressor engines.

882. We know that people do get poisoned, undoubtedly?—Yes. Hydrogen-sulphide, for example, would act in exactly the same way.

883. That would have to come, in some respects though, under a different category from "caisson disease"?—Yes; it would be very difficult to separate the two things, because I believe that these poisonous gases would act in this way—that they would make the man much more liable to bubbling when he was decompressed. His heart would be damaged by these poisons, and he would not get rid of the nitrogen so well as the normal man, so that they would contribute to the development of true caisson disease.

884. But you told us, I think, that in that com-

pressed stage there is oxygen present in the blood which, when decompressed, is suddenly liberated, and then the carbon monoxide begins to do its work with more effect. Did I understand you to say that?—Yes; it is a struggle between the carbon monoxide and the oxygen to possess the hæmoglobin substance in the blood, and when the man is decompressed the oxygen pressure would fall down to the normal atmospheric pressure. Of course, he would have part of his blood combined with carbon monoxide, that combination having taken place in the caisson, and in those conditions he would be worse off.

885. That carbon monoxide would not come off, but would remain combined?—It would remain combined; the want of oxygen would weaken his heart, the circulation would be less efficient, and therefore there would be more likelihood for the nitrogen bubbles to come out in his blood.

886. (*Dr. Legge.*) Is caisson work ever carried out except under medical supervision of the workers?—Well, I think there has always been a medical officer appointed.

887. And is he always in close proximity to the works to attend to the men as they come out after decompression?—That has generally been the case. The County Council in their tunnels, such as Blackwall and Rotherhithe, have appointed officers in each case.

888. So it might be desirable that such a person should be appointed as a referee in these cases?—Such medical officers may have no especial knowledge on the subject. The ones that I have come across have had no special qualifications for dealing with caisson disease at all. They were appointed to examine the men and reject unsuitable men, but that is a thing which is almost useless. I mean you cannot reject unsuitable men, you cannot find out who is unsuitable except as regards age, and that they pay no attention to. A medical officer who has held such an appointment, and has seen many cases, and studied the subject, would make a good referee.

889. Are the means of regulating decompression in the caisson as simple and easy for instance as in your laboratory experiments?—Yes, they are perfectly simple. They have the decompression chamber—what they call the “lock”—into which the workmen come, which is a long steel tube just giving you room to stand in or to sit in, and then there is a tap, and the air is allowed to leak out, and it is merely a question of controlling the rate at which the air leaks out.

890. So that your experiments are exactly analogous?—Exactly the same.

891. (*Chairman.*) You used the term “bends”?—Yes.

892. What is the meaning of that?—I think it means that the man is bent up—that the pain is so severe that it bends him up. The divers call these pains “pressure”; in describing their symptoms they speak of “the pressure,” and the caisson workers generally talk of “bends.”

893. You mentioned blindness as being a possible result of compressed-air illness. I use that as an illustration. If a man became blind after being employed in a caisson, do you think that a court of law or a medical referee could interpret that as “compressed-air illness”?—He would have to become blind suddenly, and within an hour or two of decompression.

894. Do you never get a case of blindness coming on after a time?—No. It is an instant stroke, a bubble gets into the artery and the blindness is instantaneous. There is nothing like it in medicine, except perchance a fragment of a solid body getting into the artery. We do know of cases of that kind—what we call vegetations—little inflammatory growths on one of the valves of the heart; a piece of such may get swept off and be carried into one of the central arteries of the retina. Such a mischance is exceedingly rare.

895. (*Professor Allbutt.*) Is that blindness permanent?—In the caisson business?

896. Yes?—There is only the one case on record that I know of; that is why I have mentioned it; it occurred to one of the sponge divers.

897. (*Chairman.*) Would it not be simpler or safer

to say “compressed-air illness” rather than “caisson disease”; or would you say that this blindness is “compressed-air illness”?—If a bubble gets into the central artery of the retina and suddenly produces blindness after decompression, that is a case of compressed-air illness.

898. Do you ever get cases in which men are made ill by carbon monoxide or other gases only, apart from the question of compressed air in a caisson?—No, I have never come across that. Of course in other works—in mining and that sort of thing—carbon monoxide is of great importance in a great deal.

899. But that of course would be considered simply an accident?—In these caisson works there are certain cases which I believe carbon monoxide has had something to do with; it is not established.

900. But it is never the primary cause of the illness, is it?—I think it may be.

901. It may be the primary cause?—I think it may be the cause of the caisson illness. Anything that causes it—great fatigue from hard work may contribute to the nitrogen bubbles being given off; anything that weakens the circulation and the respiration and hinders the giving off of nitrogen quickly from the lungs contributes towards these bubbles occurring, and carbonic oxide poisoning may act in that way.

902. You would not say that cases were likely to occur in which men employed in caisson work suffered from carbon monoxide poisoning, but could not be diagnosed as suffering from compressed-air illness?—No; that I really could not answer. The cases that Mr. Moir described to me as occurring recently in the New York Tunnel seem to me much more like carbon monoxide poisoning than compressed-air illness; the men fell, unconscious, immediately after they were decompressed, and they recovered when they were put into a recompression chamber and recompressed; and two of the cases which occurred were due to a fire in the caisson. A fire occurred, and there was danger of explosives going off, and two of the men placing an air pipe to their mouths rushed down the works to drag away the explosives. The tunnel was full of smoke and products of imperfect combustion, and when they came back and were decompressed they both fell unconscious, but quickly recovered by re-compression. Those cases were not, I think, compressed-air illness; they were carbon monoxide poisoning.

903. If simply “compressed-air illness” were put into the third schedule of the Workmen's Compensation Bill there might be a danger of litigation, as to whether a particular case was compressed-air illness or whether it was carbon monoxide poisoning, might there not?—The condition of the ventilation of the tunnel would settle that at once. If the ventilation was adequate, it would show at once that there could not be a dangerous percentage of carbon monoxide present, I think.

904. Do you think it would be just, where a man was claiming compensation on the ground that he had compressed-air illness, to throw the burden of proof on the man that it was due to his employment, or do you think that the burden of proof ought to be thrown on the employer to show that it could not have been due to his employment? I might explain; I do not know whether you are familiar with the framework of our Bill—the Workmen's Compensation Bill of this Session. In it the diseases of “occupation” are divided into two classes—all those which are at present in the Bill come under the first class, in which, if the man is suffering from a disease—say, for instance, anthrax—and has been engaged in wool-sorting or other processes, then the assumption is that his “anthrax” illness is due to the wool sorting, and the employer has to prove (if he can) that it is not due to the wool sorting, but that it is due to some extraneous cause. Then there are other diseases which may be included in the schedule as to which the burden of proof would be thrown on the man, where it is not practically certain that the disease did arise from his employment, and in which he has to prove, it having been established that he is suffering from the disease, that it was due to his employment. Which do you think would be the more just in this particular case?—I think it would be more just for the employer to have to disprove.

905. You think there is practically a certainty that if the man has been employed on this work and has

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Mr. L. Hill, these symptoms the symptoms are due to the work?—
M.B., F.R.S. Yes.

9 Nov. 1906. 906. (Mr. Cunynghame.) Can you tell us what the proportion of nitrogen absorbed by the blood is—how many cubic centimetres the quantity?—For every atmosphere a hundred volumes of blood takes up 1.1 volume of nitrogen. That we have proved upon ourselves.

907. Then a man can get this absorption of nitrogen simply as a diver, without any going into a bell or a caisson, can he? I mean that the mere air that he has got in his lungs would contain sufficient nitrogen to be absorbed and to be dangerous?—No not “to be dangerous.” Under one atmosphere we always walk

about with 1.1 volume of nitrogen in every hundred volumes of our blood; but that is not dangerous, because it is in equilibrium with the atmosphere.

908. How does the diver who goes down simply naked into the sea get enough nitrogen into the lungs to be capable of its being absorbed to such an extent as to endanger him?—He does not if he goes down naked; it is only dressed divers who suffer.

909. I understood that these “sponge divers” were naked divers?—No; I was speaking of dressed divers. The naked diver never suffers.

910. The naked diver never suffers?—The naked diver never suffers from caisson disease.

Mr. A. B. ROGERS, called in and examined.

Mr. A. B. Rogers. 911. (Chairman.) You are the civil surgeon, I believe, at Cliffe Fort?—Yes. In practice at Cliffe village.

912. At Rochester, is it?—Cliffe near Rochester.

913. And you have had special experience of the subject of poisoning by nitrous fumes?—I have, unfortunately, had two or three fatal cases at Messrs. Curtis and Harvey's high explosive works.

914. This poisoning arises chiefly in what industries?—It arises in the manufacture or the mixing of the acids that make nitro-glycerine.

915. Do you know whether it occurs in any other industries?—The only other case that I have heard of was one that occurred in Scotland—Gay Lussac—I heard of it from one of His Majesty's Inspectors in Scotland—there was a death there at the beginning of the year.

916. A death where?—Somewhere in Scotland—that is the only other case I know of.

917. In what industry?—My information does not tell me what that was. It must have been in a sulphuric acid works, I take it.

918. Do the symptoms arise suddenly or gradually?—Very gradually. There are no immediate symptoms at all—not for some hours afterwards; the people will stay at work. In the first case I had the man was at work for four hours after he was fumed; he then began to show some symptoms.

919. Does the fuming take place at a particular moment, or does it gradually increase?—There is constant fuming throughout the manufacture—the mixing of these acids, and at times when they get mixed a little bit wrong—when there is some mistake or something, then fuming takes place suddenly. In the first case that I had the man had neglected to turn off a cock which was left running all night to drain some of the gullers. He telephoned up the hill to let the nitro-glycerine come down, and some of it was spilled on the floors. He put some caustic soda on it, and it would naturally fume at once. That occurred about seven in the morning, and I did not see the man until a quarter past two in the afternoon. He died the next day.

920. A case of that kind is really an accident rather than a disease, is it not?—Yes, it was quite accidental. In the other case—the last case—that is the case of Mr. Woodall—they mixed the acids wrong, and he went in and tried to get them out again. He was in the fumes for about an hour, I suppose.

921. (Professor Allbutt.) May I interpose a question? When you say you did not see him until a quarter past two you mean it was not urgent?—He did not complain; he never reported himself.

922. Because the symptoms were not urgent?—Not urgent at all.

923. It was not owing to some neglect?—Not at all. There is nothing particularly unpleasant in breathing the fumes.

924. (Chairman.) Then you do not have cases of poisoning arising from the fact that men have been working for a long period in these nitrous fumes, and have gradually got worse and worse?—No; in all these places where they work they are quite open to the air. There can be no explosion of the fumes except something goes wrong with the works at the time. There never should be any fuming at all, of course, beyond a certain amount of fumes that are constantly

given off in these acid works, and the men get quite used to that.

925. They are not incapacitated by them for any length of time?—Not unless they have had an overdose. I have had about five men who have had a slight overdose, and have had to be absent for about a week.

926. The effect of the overdose is always sudden, is it?—No, never sudden.

927. In what cases?—Once a man was at work in the acid recovery plant, and there was a crack in one of the pipes, and he was at work rather long, and he suffered a bit from nitrous fumes. He was not very bad; I just kept him at home for a week, and then he was all right again.

928. You could say that he got poisoned at a definite time—within one or two hours?—Yes; all these cases take place at a definite time, and not through continuously working in the fumes—that does not have any detrimental effect at all.

929. Can you distinguish with certainty the symptoms of this illness from any other illness?—There is no doubt when the symptoms do arise as to what it is; besides that, you have got the history of the case.

930. But if you had not got the history of the case you would not necessarily be able to say: “This is a specific illness which must be due to nitrous fumes”?—No, he is suffering from an acute pneumonia.

931. But if you know the history of the case you can always say with certainty that it does arise from the nitrous fumes?—You could always say that he was ill from inhaling something that was irritating, but you would not be able to mention the nature of it except from the circumstance that you know that these things are apt to occur in your neighbourhood. I get various kinds of fuming down there. At the cement works we get carbon monoxide sometimes, and a good deal of sulphur fumes sometimes, but nitrous fumes are quite different from those.

932. In every case the symptoms are due to some sudden cause?—Yes.

933. And not to a gradual impregnation by the nitrous fumes?—No, it is always due to some sudden cause.

934. Therefore, it is really just as much an accident as in the case of a man who suffers in a coal mine from an explosion of gas?—Yes, just as much.

935. (Professor Allbutt.) The mode of death is by acute pneumonia?—Yes, the lungs are completely filled with a brown watery fluid—absolutely filled.

936. Both lungs?—Both lungs, yes.

937. It does not set up the ordinary acute pneumonia, but it is the general effect of the whole?—The whole of the mucous surface of the lung is affected.

938. That in itself would be characteristic, would it not?—Yes, only you do not find that out until the post mortem.

939. Could you not by clinical examination?—Scarcely; it is so rapid after it once commences; the increase is so rapid. The whole lung is bubbling to start with.

940. But still, the point is that there is no cumulative effect of any kind, as you have told the Chairman; for example, the man would not become subject to any symptoms like hay fever, bronchitis, or anything of

that kind?—No; we have eight or ten men working the plant there, and they are perfectly healthy.

941. (*Mr. Cunynghame.*) Does a man either recover completely or die in a case of this kind?—Yes, he either recovers completely in the course of a day or two, or he is dead within a very few hours; but there are no symptoms at the time.

942. (*Dr. Legge.*) Have you noticed a marked effect on the teeth of men working in these fumes?—No, nor have I had any complaints.

943. Do the teeth become eroded?—They have never complained about it.

944. You have not noticed it?—I have not noticed it. They are old patients, and they would have complained; I should have heard of it if they had noticed it.

945. Do the men suffer from injurious effects in the nitro-glycerine department?—They suffer from headache when they begin to work in it.

946. Is that transient?—Yes; after they have been working at it some days the headache goes off, and they do not suffer any more.

947. Are they incapacitated from work?—Sometimes.

948. For how long?—For a few hours.

949. Not more than that?—No. You find it happen in the case of those who are handling the cordite; they also suffer from this nitro-glycerine headache. It is due to the dilatation of the blood vessels of the brain.

950. Then you spoke of sulphur fumes, too?—Those we get at the cement works.

951. (*Professor Allbutt.*) On this question of headache, do they become tolerant of the fumes?—Yes.

952. (*Dr. Legge.*) You spoke of sulphur fumes?—Yes.

953. Do you mean sulphuric acid fumes?—No, the sulphur fumes come off from the burning coal and coke. We find those in the cement works.

954. With what effect?—They call it a bad choking effect; and they seem to have more effect on the stomach than on the lungs.

955. Does that incapacitate the workers?—For a time; they recover very quickly.

956. For how long does it incapacitate?—Generally for an hour or two.

957. Have you had to treat them for a week at a time?—No.

958. Does it leave any effect—the sulphur—this choking?—No.

959. Is the work so constant that they remain at it for a sufficient number of years for you to be able to say whether they have got chronic bronchitis as the result of it?—Yes. These men have been working in these works for generations. The works have been going ever since I have been there, that is ten years. There are no ill effects from it bodily; it is only at times, when they get what they call a down draught, that they get these sulphur fumes. Usually the fumes go up the high chimney, and it occurs from a change of wind, or from some cause or other; they get this down draught. Then these men have to clear out of the kilns. For that I do not always get consulted. They usually treat themselves by mixing up a lot of chalk and milk and swallowing that, and that puts them all right.

960. And they can return to work next day?—Yes.

961. Do you know of the use of sulphur in other industries, such as the cleaning out of ships?—Disinfection of ships?

962. Yes.—We use sulphur as an ordinary disinfectant in all cases of infectious illness.

963. Its effects there would be just as you have described, you think?—As a disinfectant?

964. No, I mean its effect on people who are exposed to the fumes?—Yes, I think so. I never knew anybody who would go near a room that was being "sulphurised." It is exceedingly unpleasant. On the question of the treatment of these men who have had the nitrous fumes, my own idea is that I think they should have a strong emetic. The Germans recommend the treatment, I think, of chloroform. I do not know whether you intended to go into that. You have my report there.

965. (*Chairman.*) Our business as a Committee is not either the prevention or the cure, but compensation.—I see. Of course, I did not know that.

966. (*Dr. Legge.*) Do they make picric acid?—No.

967. Do you get men exposed at all to chlorine fumes?—No.

968. Hydrochloric acid?—No; we do not use any on the works at all. We use a good deal of sulphuric acid, and it is in the recovery of the sulphuric acid that they get a good deal of these fumes.

969. (*Chairman.*) Is there any disease that is gradually contracted, and not in the nature of accident, which the men employed in this industry suffer from?—No, I do not think so. I never heard of any. The works have only been opened with us some three or four years. My experience does not go over a large number of years, and I do not remember to have read of anything of the kind. They seem to get quite tolerant of the use of the nitro-glycerine. It has a marked effect at first, but it soon goes off.

970. (*Dr. Legge.*) Do you say the works have only been opened three or four years?—In saying that I was speaking of Curtis and Harvey's; they have only been running about four years; four or five years.

971. You say you have seen some 12 to 15 cases of poisoning by nitrous fumes?—Not 12 to 15. I think I have had three deaths, and I have had four or five other cases, I think.

972. You say here, "I have seen some 12 to 15 cases of fuming since I have been here, and there have been three deaths"?—Well, there would be about 10—10 or 11 altogether. At the time when Mr. Woodall died there were five. Five were fumed at that time, but Mr. Woodall was the only one whose case was fatal.

973. Have the others been isolated cases?—The others have been isolated cases. One died after the explosion, when the hill was blown up; another was the case where the nitro-glycerine was spilt.

974. Is it a Government factory?—No, it is the private factory of Curtis and Harvey. They are contractors for the Government.

975. You have not heard of similar cases occurring in other places?—No, and I cannot find any literature on the subject of nitrous fuming. I have looked through a lot of the "Lancets" and I cannot find anything about it at all.

Mr. A. B.

Rogers.

9 Nov. 1906.

FIFTH DAY.

Thursday, 15th November 1906.

PRESENT:

Mr. HENRY CUNYNGHAME, C.B. (*in the Chair*).

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Mr. JONATHAN LONGBOTHAM, called, and examined.

Mr. J. Longbotham. 1977. (*Chairman*.) You are managing director of J. Grayson Lowood and Co., Ltd.?—A director, and I am consulting engineer.

1978. Director and consulting engineer of the firm of J. Grayson Lowood and Co., Ltd., manufacturers of silica bricks and fireclay goods, Deepcar, near Sheffield?—Yes.

1979. You have been acquainted intimately with the character and nature of this business for many years?—I have.

1980. And the firm, I suppose, is one that may be called one of the leading and characteristic firms that carry on the work in this country?—Yes.

1981. I believe we may take it that your works would exhibit an example of a well-managed ganister works?—Yes.

1982. Now, the process carried on at your works, I believe, is as follows. You will correct me if I am wrong. The ganister, when brought to the surface, is first submitted to the action of a cracker or crusher?—Breaker, we call it.

1983. Which reduces the ganister into the size of pebbles?—Sizeable pieces, rather bigger than pebbles.

1984. This process is done under the action of steam jets?—Yes.

1985. With the view of carrying away any dust that may be generated?—Yes.

1986. The crushed material is then placed either in a damp or completely wet condition under very heavy iron rollers?—Edge runners.

1987. Very heavy iron edge runners, by which the product is reduced to paste?—To paste.

1988. It is then mixed with a certain proportion of lime?—About $1\frac{1}{2}$ per cent. We keep it as low as possible.

1989. The lime in a solid state?—No, lime water.

1990. You do not let any of the solid lime go into —?—No.

1991. It is mixed with lime water, and then moulded into bricks. These bricks are placed by boys on the drying shed floor?—Yes.

1992. On a warm floor in a dry shed?—Yes.

1993. And dried? They are then stocked in furnaces and burnt?—In kilns.

1994. After which they are ready for the market?—Yes.

1995. We have now got the outline of the process. In the case of works like this would you expect a certain amount of phthisis?—Well —.

1996. I am inviting you to give your own view?—Do you mean phthisis in a general sense?

1997. Consumption?—Ordinary consumption.

1998. I have used the general term on purpose for you to designate it as you like, for you to put your view forward?—Yes, I think so.

1999. Some of those who suffer in this way, I suppose, would be cases of ordinary phthisis, such as is got by men in every employment?—Certainly part, probably the greater part.

1000. Part, I suppose, is to be attributed to ganister dust?—So the medical experts say.

1001. That is the proper reply, of course. Then have you anything to say in contradiction of that medical view that ganister dust is capable of producing phthisis apart from ordinary consumption?—No, I could not. I could not give any opinion against the medical experts, because I know nothing of it, you see.

1002. Have you any figures giving the relative amount of consumption among the men in a factory like this, and consumption among the working population generally?—I have no figures whatever, except that there were some prepared prior to 1900, and I do not think they were prepared under the best conditions. These figures are given in a Blue Book on page 494. It takes about ten pages of the report of the Chief Inspector of Factories for 1900.

1003. From conversation I had with you, I gather that your firm consider that whatever proceedings may be taken to deal with this matter under Schedule 3, the trade ought to be protected from claims made in respect of ordinary consumption?—Certainly.

1004. That is to say phthisis not necessarily proceeding from ganister?—It would be very difficult to get the necessary information.

1005. And do you believe that it is possible to distinguish the two diseases one from the other, and to say how a man who has got phthisis contracted the disease?—I do not think the laymen would know.

1006. But how far is your firm in a position to form an opinion? Has your firm a doctor? How far are you yourself in a position to say?—I really could not say.

1007. Your doctor is not here?—Well, we thought probably you would have been calling a local doctor. We have no doctor specially employed by the company.

1008. I understand that the local doctor is going to give evidence before us?—We believe that that particular doctor has very strong views on the question of ganister.

1009. There seems no doubt, is it not so, that great improvements have been brought about in the conditions of work in your own factory and others during the course of the last thirty years?—Oh, yes, very great.

1010. And I believe you represent, as far, at all events, as over ground operations are concerned, such as we have seen to-day, that the risk of phthisis would be very small indeed, in your opinion?—Very, indeed, we think.

1011. Now is there anything else you would like to add to what you have said?—You have not mentioned anything about the mining.

1012. Perhaps I had better take the mining?—The mining is the subject upon which I am perhaps more at home than the other, being a mining civil engineer.

1013. Would you give us your views of the subject as regards mining, as regards mining and this disease?—The only conditions, I think, under which there is danger of inhaling dust are when the men are engaged in drilling holes for blasting, and when they are removing the dust and the lumps of ganister into the tubs for transit to the surface, and any danger there would be, assuming there is such a disease, would be greater if the ventilation of the mine were not properly

carried out. The statistics that have been given of deaths from this disease were very considerable before 1890-1900, partly because there was very little attempt made to render dust innocuous, and partly because the ventilation of the mines was not so complete as it is at the present time. Several things have been done within the last few years to lay the dust, one of which is the provision of cans containing water, which the men have in their working places, and the water from which they pour on to the stone before they remove it into the tubs. They are also supplied with, when they require them or request them, respirators, and we keep a considerable stock of respirators in the store house. We find that the men are very indifferent about the use of the respirators, and, in fact, I think you may go in to the working place almost daily and find very few of them using it. We believe that the use of the respirator at any rate would do more than anything else to prevent the inhaling of the dust.

1014. What type of respirator do you use—aluminium and cotton?—You might see one. We will produce one.

1015. Is it found that the use of the respirators impedes the men working?—They say that it is very inconvenient. Of course that is because they will not use themselves to it. You can take it off a little for a rest and put it on again. That is all that would be needed (*respirators produced*).

1016. These are the respirators?—Yes, they are quite impervious to the passage of dust.

1017. These consist of wool?—Woollen material. Wool and cotton. These are got specially.

1018. Of the woollen material with cotton covering?—And there is no restriction as to the number of respirators they may use. If one gets dirty and wet they can come and apply for another.

1019. Who supplies these?—They have a trade name; from a Manchester firm.

1020. Is there anything else?—We think that, before the industry is placed under Schedule III., we ought to see how the special rules which were only arranged last year, with a view to prevent the disease, operate, otherwise there may be a considerable number of men now suffering from lung disease who might be thrown sooner or later on to the companies' compensation list, which would very seriously cripple the industry itself, and I think one of the first things it would be necessary for the company to do would be to have every man examined, and ascertain whether he had even the beginning of the disease upon him, and then I do not know what the result would be. It would depend upon the number who were suffering from lung disease whether the works would have to be practically closed or not, for the time being, at any rate. For instance, if there is a large percentage of the men now suffering from lung disease, on a medical man's certificate it might be stated to be fibrosis or ganister disease, as it is called, and the onus would be thrown on the employer of proving that it was not so, which would be difficult, as it seems to be hard to diagnose or differentiate between ordinary phthisis and ganister disease, and the employer should not be penalised for the past. We ought not to go back into the past and be responsible for the disease, if contracted years ago; but the Act, I take it, does not contemplate such a course.

1021. Therefore you mean that any liability under the Act ought to be limited to cases in which the disease has been caught after the Act comes into operation?—Certainly, it ought to be limited to that at least. Supposing you examined the whole of the men, and you found there was a considerable proportion—say, 50 per cent.—I do not say there is anything like that percentage, but assuming that there was—suffering from lung disease in any form, what would our duty be? We could not take upon ourselves the liability.

1022. (*Dr. Legge.*) Have you ever had an examination of the men carried out?—No. If we had known this was going to take place we should.

1023. It was suggested in this report in 1900 that there should be a periodical six-monthly examination, and that the persons affected should be eliminated?—This has not been done because we did not wish to deal harshly with our work people. It is a pity, however, in present circumstances, with this Bill about to become law, that this has not been done.

1024. Do you know of men who have left the work because of, say, shortness of breath or something affecting their lungs, who have come back apparently quite recovered?—I think you would get that information better from the mine manager.

1025. He is not here?—No, not yet; I thought I would like to finish my evidence first. I wanted very much to impress upon the Committee the point that I have just mentioned.

1026. (*Chairman.*) Your point being that some discrimination must be made between men who have got the disease in past years and some time ago, and the men who develop it after the Act comes into operation?—Yes, and I would like to refer you while you are here to a talk which I had in the presence of Mr. Cunynghame with a man who was engaged in a kiln, stacking the bricks before burning, in which he said he was a member of a family of nine and he was the only one who had worked at the brick works, that they were a consumptive family, that he was the oldest remaining member of the family, and that six of them had died of consumption, all under thirty years of age, none of those having worked at the brick works.

1027. (*Dr. Legge.*) Was that a man called A.? I examined a man in 1900 who was setting bricks who said he was of a consumptive family, consisting of nine brothers and sisters, of whom six had died of phthisis. That may be the very man?—It is strange that I should have asked the same man.

(*Chairman.*) Is he free from phthisis?

(*Dr. Legge.*) I had noted him as having good physique and found his chest healthy.

1028-9. (*Chairman.*) That is the man, evidently?—I do not think there is any harm in mentioning his case again. What I want to point out is this: that if there were any similar family history in another case it would be almost a miracle for the man concerned not to be suffering from phthisis, and if he was affected with the disease, it would invariably be put down to his occupation.

1030. (*Dr. Legge.*) You understand the way in which the Act is to be administered, that persons suffering have to be examined by the certifying surgeon for the district, and on his certificate it is decided whether the disease is due to the employment or not?—Yes.

1031. And if there is any dispute either on the part of the worker or the employer as to that decision, it can be referred to a medical referee, whose word is final?—Yes, and who appoints him?

1032. The Secretary of State. There is no litigation as may arise in the case of an accident. You do not dispute, I suppose, that the list of deaths here is largely due to ganister?—I cannot dispute them or accept them.

1033-4. I will just finish this question. I was referring to this list, largely due to ganister miners' disease, published on page 485, because I have notes to the effect that you were good enough to supply me with the names of the men employed here who had died since 1893. I got these names and their ages, and then ascertained from the death certificate the cause of death, and that is what appears on this list not only from your firm but from others?—That is really a conglomerated list.

1035. That is a conglomerated list?—Both your conclusions and our information.

1036. You furnished the names?—Of those who died.

1037. Of the deaths, and then the cause of death was ascertained from the death certificate?—By you?

1038. By us.—I have no reason to dispute what you say.

1038-40. This includes also deaths in other silica fire brick companies here in addition to yours?—Yes.

1041. Is there any sick club in connection with your firm?—That is a question you must ask the management. There is a sick club, I believe. The workmen administer it themselves. I should like to say that the management desire to know what is the true reading of section 8 of the Act. Does it intend that we shall compensate men who contract this disease through ganister in future, or does it mean that next year we shall be bound to compensate all those men who may be considered to have contracted it in the past? This question is one of great importance for us,

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15 Nov. 1906. and I think for the men also. Supposing that we had all the men examined and a number of them were certified to be suffering from the disease. If these men continue in their employment, can it be so arranged that they would not come within that Act?

1042. Those at present employed?—Yes, if they agreed of their own accord to continue work; certainly that is a very important thing to us, because I do not know how we are going to manage if there is a large number, and I am not so sure there may not be. The industry will not stand a great deal.

1043. (*Chairman.*) Your contention is that the Act was not intended to apply to diseases caught in the past?—Yes.

1044. And consequently that in any case in this industry it would be probably necessary to have recourse to the powers under sub-section 6?—Yes.

1045-6. (*Dr. Legge.*) There is another section; any claim can be lodged within a year after the cessation of employment. If a man left and developed and died from phthisis, combined with ganister disease, within the year, it would be very hard on him if he could not recover compensation?—If he got it before?

1047. Supposing you were to examine all your men, and you were to dismiss those who showed signs of the disease?—Yes.

1048. And one of these died within the year afterwards, within the time that the Act admits of claim being made his relatives might recover compensation?—Then you are going back again; that is making the Act retrospective and would be very unjust.

1049. No, the death takes place?—After I have dismissed him.

1050. Within the year. The Act specifies the limit of a year?—I see.

1051-2. Have you ever placed any limit on the length of time that the men should work here?—Do you mean as to period of hours work?

WILLIAM BELL, called, and examined.

Mr. W. Bell. 1063. (*Chairman.*) You are one of the workmen here, are you?—Yes, Sir.

1064. What do you work at?—I am timekeeper.

1065. You act as secretary to the benefit club, do you?—To Court Lowood, of the Ancient Order of Foresters.

1066. That is a branch of the society which is established here?—Yes, Sir.

1067. How many men in this mine belong to that society?—Well, I should have to have my books to say exactly.

1068. Can you give us the figures approximately?—We have not many miners at present. I am speaking of the Foresters, not of the workmen's club. The workmen's sick club for men on the surface is not, I believe, in existence now.

1069. Is that because the men have taken to the Foresters' Society instead?—I cannot say that. There was a lot of sickness which exhausted their funds, and when they found there was no chance of their getting sick pay they would not go on paying. That was the top men's society. The Foresters are a branch of the society all over the world, of course. We have a few members here, and I have several members in other works all about.

1070. You used to be secretary of the top men's club?—No, not secretary for them.

1071. Have you given any relief pay from the Foresters in respect of men who were ill here?—Yes.

ARTHUR STEERS, called, and examined.

1053. Length of years?—No, nothing.

1054. That no man should work after he had been employed ten years?—No, oh, no. No limit of that kind. I think that would practically mean an insurance fund being arranged.

1055. I suppose you could supply the Committee with the figures as to the ages of the men and the duration of their service, of the men who are working here at the present time?—Yes, we could get them.

1056. Then you have a sick club. Do you administer the funds of the sick club?—No.

1057. Is the report printed?—I have nothing to do with it. They have it amongst themselves.

1058. Do they get their sick pay only after producing a medical certificate of the cause of absence?—Yes.

1059. Are these certificates kept?—I do not know.

1060. (*Chairman.*) What you have wished to explain is this; the result of placing this disease in the Third Schedule to the Workmen's Compensation Bill might be to bring about the wholesale dismissal of the men?—I am afraid that that is the only course that would be open to us. We do not want to do it. If we had to dismiss these men it would paralyse our business for a time. There is no doubt about that, and, if we did not dismiss them, we should be taking over a liability that would be very serious.

1061. That is your side. On the other hand, on the men's side, it would be that they would lose their employment?—There are only two alternatives. Either we must go on with the risk of this liability or we must stop the works, in which case the men lose and the business is paralysed.

1062. (*Dr. Legge.*) Do you know whether the families of men who have died of ganister disease are in receipt of poor relief?—I think there may have been such cases. I do not know whether there are.

1072. You have in the course of last year?—Yes.

1073. For what complaints did they get that pay?—Mostly colds, or for sickness, influenza, and, of course, some for small accidents.

1074. I do not want to know of the miners' accidents. Has there been any relief pay given to members who have suffered from ganister disease?—Only to one member. He died from that.

1075. In the course of the last year?—Yes, at the commencement of this year.

1076-77. What was the cause of death, as given on the death certificate?—I cannot say. I have not the book with me.

1078. (*Dr. Legge.*) Is there any limit to the length of time for which the person receives sick pay?—There is no limit, only it falls as the time goes on. Twenty-six weeks 10s.

1079. And after that?—Twenty-six weeks 7s. 6d. And then the remainder is 5s. to the end of the sickness.

1080. No question was ever raised by the Order of Foresters in making the conditions of insurance more difficult for the men employed here?—No, Sir. They only insisted upon a penny extra for miners, but that accounts for all miners, a penny extra for the miners per fortnight.

1081-82. Are there many of the ganister miners who insure?—Not many.

Mr. A. Steers. 1083. (*Chairman.*) What is your work, below ground?—No, Sir.

1084. Surface work?—Yes.

1085. What is the nature of it?—Engine driving. I work the hauling engine.

1086. You are secretary of a benefit society for the men, are you?—Yes.

1087. Underground?—Yes.

1088. Only?—Yes.

1089. What do they pay a week towards the society?—Sixpence.

1090-1. Do all pay the same sum?—Yes.

1092. Now, what benefit do they get in case of illness

or accident?—Ten shillings per week for the first twelve weeks, 5s. for twelve weeks, and then half a crown per week for the remainder of the sickness.

1093. But if the sickness lasted all their lives?—They would get it all their lives.

1094. It goes on?—Yes.

1095. Is your society financially all right?—Yes.

1096. Because the club amongst the upper men has ceased to exist, being financially unsound?—Yes.

1097. They paid away what they had and were unable to continue?—Yes, but we have always had something to divide at the end of the year.

1098. It is a sick and dividing society. But if you divide up, what becomes of the men who are on the list permanently? They might lose everything?—We keep these on.

1099. It depends upon the goodness of the men, I was going to say, in subscribing for the next year, because if they were to divide up at the end of the year all there was and refuse to continue the society?—They do not get so near. They do not divide so near. They only divide what they can safely divide.

1100. Having regard to their liabilities?—Yes.

(*Mr. Longbotham.*) I do not think he understands that question. It is an actuarial question.

1101. (*Chairman.*) How many members, roughly, have you got in that society?—I should say 130; perhaps a little more.

1102. And how many underground men are there altogether?—I could not tell you. They are very nearly all in. I should say about 160.

1103. How many men have you got at the present time on the books receiving pay?—I could not tell you to one or two; not very many.

1104. Not more than a few?—Not more than a few.

1105. What is the matter with these men?—There

are one or two suffering from accidents and some from sickness.

1106. Have you any men on the books that are suffering from ganister miners' disease?—I do not think we have any now, Sir.

1107. You have been, I suppose, here or in the trade some years?—I have been here about eighteen and a half years.

1108. Have you seen men in the past made ill by the dust?—Yes, I have seen some of the men that had this complaint.

1109. What are the symptoms you have observed, through dust; what are the symptoms?—Something like consumption, they waste away.

1110. In the past have you made payments from the society's funds to men who have suffered in that way?—Yes.

1111. Have you had any deaths?—Yes.

1112. And how much do they get in the case of death?—Five pounds.

1113. The widow gets that?—Yes.

1114. And you say that the amount of illness through the ganister dust is decreasing very much now?—I should say so.

1115. Less than it was when you were a lad?—Less than it was, I should say.

1116. I suppose it is rather difficult to get men to wear these respirators amongst other things?—I do not know, I am sure; I do not get amongst them much.

1117. You are not down enough for that?—No.

1118. (*Dr. Legge.*) Were you one of the members from the very start?—Yes, from the start of the club.

1119. On what did you model it; what other society did you take as your model?—I could not say.

1120-1. (*Mr. Longbotham.*) How long have you been secretary?—Only these last two years.

Mr. JOHN McLAREN, M.B., C.M., called, and examined.

1122. (*Chairman.*) You are a Bachelor of Medicine, of Edinburgh University, I believe?—Yes.

1123. You have been in practice here for ten years?—Yes.

1124. Are you employed by any firm professionally, or by the men?—Well, I have an agreement with one firm in my neighbourhood to render first aid when required at their expense.

1125. I see; I was desirous of discovering what connection you have with either the employers or the men?—I have one small club of about twenty members.

1126. That club, I suppose, is composed of working men?—Yes. The club members reside in a widish district. They are not necessarily employed in these works.

1127. Are they workmen?—Not purely. Some are farmers.

1128. But some are workmen?—There are a few miners amongst them.

1129. And that club employs you?—Yes.

1130. It is a small medical club?—For medical attendance.

1131-2. Have you had many cases of phthisis, using the term in the general sense?—By phthisis you mean disease of the lungs. There has been a certain amount in the neighbourhood since I took up practice there.

1133. You say that there has been a certain amount of phthisis. Can that be attributed to ganister?—A certain proportion of the cases, undoubtedly.

1134. Have you seen cases of phthisis produced by ganister?—Yes.

1135. The disease has a great deal diminished of late years, even since you have been here?—In my time; it has practically of late years become extinct.

1136. You would use such a strong expression as that?—In my district.

1137-8. What district is that?—The district of which I am certifying factory surgeon, which practically coincides with the area in which I practise.

1139. (*Professor Allbutt.*) What is the name of your district?—Oughtibridge.

1140. (*Chairman.*) How many square miles is that district? What is the area from one end to the other?—It is rather sparsely populated. It is one of the biggest factory districts in England, but possibly the smallest population.

1141. Largest in area and smallest in population?—I believe it extends from the Don to the Derwent in one direction.

1142. And the amount of the population?—It is not thickly populated.

1143. Have you attended fatal cases of phthisis which might be attributed to ganister?—Yes.

1144-5. Have you made postmortem examinations of them?—Yes, on one occasion we did.

1146. (*Professor Allbutt.*) Let us come back to the meaning of the word phthisis. I think we all of us mean by this merely a chronic disease of the lung, with a fatal tendency of course?—Yes.

1147. You would not object to use the word phthisis to other conditions except tuberculosis. A chronic disease of the lungs—we will drop the word phthisis if you like—phthisis is a common expression?—Yes.

1148. There is no harm in it. It does not commit us to tuberculosis. You speak of phthisical disease as having a certain degree of prevalence. Are you now speaking of tuberculosis or of that and ganister disease?—Trade disease.

1149. When you came to Oughtibridge there was more of this disease than there is now?—There seems to have been an accumulation, and a certain number died who had contracted the disease some time before.

1150. And they were not recruited from any other source?—Of late years, no.

1151. Is that because there is any change in the relations of your population to the ganister works?—Well, I think it was entirely due to action which originated from the Home Office. Dr. Legge made a visit some years ago, and as a result of that the workmen seem to have been greatly impressed, and they took much more care; and voluntarily, when they do not seem well, in my district they come and ask me if I think they should not change their employment.

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1152. I see. I will put it another way. Do you recommend men to change their employment?—Not many. I have recommended a few, not many of late years.

1153. Speaking of the district, would your sphere of experience correspond with the ganister area, an area of ganister workers?—A large number of them live in my district, and a number of them live in the district and work out of it in another district where they are liable to the same disease.

1154. You give us a very encouraging opinion, that the advice given by Dr. Legge and carried out by the workers has been sufficient to reduce the disease very much?—Very much, Sir.

1155. Does that include the use of a respirator?—No, Sir, not necessarily.

1156. What are the rules or regulations by which the disease has been reduced?—I can only speak for the firms in my own area, and they have adopted, instead of as previously a dry process, a universal damp process. They keep down the dust by all means in their power.

1157. Including spray?—Spray, and they have men specially to sweep away the dust after turning the hose upon it. These men have nothing else to do but sweep away the dust.

1158. (Chairman.) You are speaking of underground?—In the mines they make every endeavour to keep things damp to prevent the accumulation of dust.

1159. (Professor Allbutt.) The dust is both above and below ground?—Yes.

1159*. Is there any regulation about entering the mine after a shot has been fired?—I cannot say. As factory surgeon I have no official connection with mines.

1160. These rules, Dr. McLaren—I daresay you have seen them—these rules (*produced*) have been compulsory for something like a year?—Might I just see them.

1161. Could you tell us whether there has been any great change in the last twelve months in the conduct of the men and in the safety of the men?—I have no official knowledge. I have never had a copy of these rules sent me.

1162. As a matter of general knowledge you were perhaps aware of them?—Well, for years the employers have been in the habit of having a regulation that a man should not go near the place after a shot or blasting for a certain number of minutes. That has been the case, I should say, at two places. I know from common knowledge.

1163. These regulations were suggested in 1899?—I see.

1164. And you have been in practice 10 years?—Yes.

1165. Then there is something of a coincidence?—Yes.

1166. During your experience of seven out of those ten years there has been so great a diminution as to amount to a practical extinction?—I can only speak for my own district in which I practice, and, of course, I do not always see every case in that area. Some even come to Sheffield for advice, but to my knowledge for the last few years, I have it in my mind that since Dr. Legge's visit, I have known, officially or unofficially, of no fresh case.

1167. As regards general liability of the district to disease, you have given us great assistance. You have nevertheless had experience of cases?—Yes.

1168. Do you think that you could distinguish during life a case of miner's phthisis from tubercular phthisis?—Yes, sir, I think from the knowledge I have I might venture to risk an opinion.

1169. In general terms?—Yes.

1170. You would assist us very much if you would give us your opinion about that?—You want a summary of the course of the disease.

1171. Will you first deal with the early stage?—The early stage is differentiated from phthisis by the fact that you do not get the wasting which is continuous in progressive phthisis. The chief early symptom, in my opinion, is anæmia, profound anæmia and increasing shortness of breath. It may or may not be accompanied by cough, and on examination of these cases, physical examination, the results are nearly always negative. A man who did not know of the existence of the disease might pronounce the person quite sound.

1172. A medical man?—A medical man. That is my view of the earlier stage.

1173. Do you know whether the temperature of the body is affected at this stage?—I could not say definitely. There are no night sweats in my opinion till tuberculosis is contracted.

1174. You think the temperature might not be affected—perhaps the hospital physician would tell us that better?—Yes.

1175. And debility?—Increasing debility. The pathology of the disease accounts for all the symptoms most wonderfully.

1176. Perhaps you will take it next?—I do not think that I can add anything to the specimen that Dr. Legge and myself took together, and to the details published in his annual report.

1177. So far as your experience goes, your description supports the details given on page 485 of the Annual Report of the Chief Inspector of Factories for 1900?—Yes.

1177*. You would expect that, in accordance with your experience?—It explains every known fact of the disease.

1178. Then, of course, if the man goes on with his trade, the forecast is inevitable?—Yes.

1179. Therefore we need not labour this point, but I think it is of importance to know a little more about those cases where you have advised change of employment. Would you suggest, from your experience in such a stage as you have mentioned, where there was anæmia, cough and debility, but no physical signs, that a change of employment would be curative?—Well, Sir, in view of the pathological examination I would say no, but I think one could get complete arrest of the disease if one was consulted at an early stage.

1180. We do not, of course, suppose that the lung can be restored to integrity, but practically the man would recover?—I have a man, who when I first came to this neighbourhood was turned over to me. He was on the parish. I have the parish appointment. He was turned over to me as an advanced case of the disease, and I, naturally at the time, did not know much about it, and I took rather an interest in him, and worked it out a little on him, and he is living to-day, and is able to knock about almost as well as I am; and I was told by my predecessor that he would probably at most live a couple of years. I have had other cases that I have suspected, young fellows becoming anæmic. I have told them to change their employment, and they have been able to work continuously.

1181. Do you mean that he changed his employment and got well?—He has never done any labouring work, i.e., since his apparent recovery.

1182. It is going a little beyond my special knowledge, but do you find any difficulty, or do they find any difficulty, in transferring themselves from one kind of work to another?—The firms in my area make a point of doing it the moment they hear that there is any likelihood of a man having the disease.

1183. (Chairman.) Are you now speaking of the factories?—Yes.

1184. You have nothing to do with the mines?—Except incidentally when miners come to consult me.

1185. The firms, are they factory firms or mining firms?—The firms are both in my area. They will consult me privately, and if the firm hears that my opinion is that the men should work outside the pit or sheds, they find them employment outside.

1186. You have never found difficulty either with a mining firm or a factory firm?—That is so. They have been treated very considerably in my experience.

1187. (Professor Allbutt.) If it is alleged that there is still a substantial amount or calculable amount of this ganister disease prevalent in the ganister area, you would consider this, so far as it went, a very grave and important matter, and you would consider that the trade itself is directly responsible for it. I do not mean the traders, but the occupation?—Yes, Sir, I think that the occupation causes a certain amount of risk.

1188. Even after these various precautions during the past seven years, so completely carried out; if there is still any of this disease you would attribute it to the occupation?—Yes.

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1189. (*Dr. Legge.*) Have you the principal factory and mine where ganister bricks are made in your district?—Yes.

1190. Have you works in Deepcar in your district?—No, but I have other similar works at Oughtibridge, and a good many of the men who work in this occupation at Deepcar live in my district.

1191. Have any firm in your own district—have you two, or more than two?—I have two in my district.

1192. Have either of them ever asked you to make an examination of the workers, to let them know what the condition of the workers was?—No.

1193. In your district of Oughtibridge, do any Sheffield workmen, cutlers, or grinders, and so on, reside?—Yes, we have a few of them.

1194. Have you been consulted by them for symptoms similar to those of ganister disease?—One similar case was of a man who had been working in silver, some branch of the silver trade, which puzzled me very much. I remember also an instance of a sheepshear grinder consulting me; his symptoms were very similar, but he had well-marked bronchial asthma in addition, a late symptom, I presume. He continues to follow his employment.

1195. Do you know of any cases where you have detected the characteristic lesions on to which the tubercle bacillus has been grafted, and the man has had the two together running concurrently? Have you seen such cases?—Most of the cases which ended fatally had that history.

1196. Have you seen one that recovered?—You mean after the development of tubercular phthisis. No, not in any case that I diagnosed as tubercular phthisis.

1197. Nor in anyone else?—I cannot say.

1198. Taking up now the question of the physical signs presented by the disease, on percussion of the chest, are there any portions, particular areas, in the lung in which you find the signs of consolidation more marked than in another?—In late cases occasionally one comes across it towards the base and sides, but I could not say it was—

1199. Is it usual to find the consolidation in the apex as in the tubercular variety?—My experience is not sufficient for me to make a definite statement.

1200. In the very early stage, when the man has no idea of giving up work, and he may have a little shortness of breath, on auscultation, would you notice anything particular about the breath sounds?—That is the thing which has puzzled me. I have not. I have always been struck by the absence of physical signs to account for the symptoms. It is the first thing that impressed me as to the necessity of caution in giving an opinion on these men.

1201. Both as to percussion and auscultation?—Yes. These symptoms were not accompanied by physical signs to account for them, not to my examination.

1202. Tubular breathing or increased respiratory sounds are not noticeable?—The cases that I considered to be early cases showed nothing on examination—on physical examination—and it was that that made me cautious, because I noticed that these men, although they showed no physical signs to my examination, got steadily worse. The physical signs appeared at a later stage.

1203. (*Professor Allbutt.*) Would you say that the absence of physical signs—the period marked by the absence of physical signs—would be the period during which it would be wise and hopeful for a man to change his employment; or, when the physical signs have appeared, is it too late for a man to change his employment?—The truth of the matter is that—I have had altogether since I have been these ten years in practice—I do not think I have had twenty cases altogether. I cannot pose as an authority.

1204-5. (*Dr. Legge.*) Are you the Medical Officer of Health for the district as well?—No.

1206. (*Chairman.*) Supposing that this disease to which men employed in ganister works are liable were placed in the Third Schedule to the Workmen's Compensation Bill of 1906, thus rendering the employer liable to pay compensation to the men who got it, could one say that there was any very serious difficulty in the way, on the whole, of the doctors and, if necessary, a doctor on appeal, being able to decide, with tolerable justice, whether the disease from which the man was suffering was or was not due to his employment?—Well,

Sir, from my experience there would be considerable difficulty in giving a definite opinion, and unfortunately in the matter there is no appeal.

1207. But there is an appeal which is provided for in the Bill; there is an appeal in this case—that is the reason I put the question to you. Would you say that there would be any very considerable difficulty in actual practice in coming, on the whole, to a fair conclusion? I have gathered from you that in a good many cases certainty could hardly be looked for. But some cases that you knew thoroughly I presume you would feel fairly certain about—a certain number?—Yes, a certain number.

1208. A number of others you would feel less certain about?—Yes, Sir.

1209. And then, I suppose, there would be another set of cases in which you would say that you feel pretty certain that the phthisis was not due to ganister dust?—To a certain extent, yes; but so far as my experience goes of the disease, time is the best diagnostician.

1210. Assuming you had time, would there be a very substantial difficulty in the way of doing justice on the whole between the parties; of course, individual mistakes might be made, but do you think the medical profession would, on the whole, be able to do justice between the parties?—Perhaps, if there was an appeal.

1211. You may assume that there is an appeal to the best medical authority of the day?—To an expert.

1212. Supposing an expert were to come down and assist, and were always available to come down?—What I would like to point out with respect to that is, that they might not have the special knowledge that we in the district get by daily experience.

1213. They would listen to your descriptions of the diagnosis, and your reasons, and with your assistance, and the assistance of the practitioners who had attended the man during sickness, would it not be possible to arrive with a fair degree of justice between the parties at a decision as to whether on the whole the disease was the result of a man's occupation or not?—Well, Sir, I would hardly care to say.

1214. I will put my point in another way. Do you represent that the difficulty—the liability to error in the diagnosis—is so great that even though we knew there was a certain amount of ganister phthisis, it ought to stand in the way of all compensation to the workman?—What I mean is, that a man who had not special knowledge of the facts of the district would be very much apt to put the cases down in the later stages as ordinary phthisis.

1215. You may assume that in each case you had the very best local experience, aided by the highest deductive knowledge that the country could obtain?—Then substantial justice would be done in most cases.

1216. The nature of the disease is such that upon the whole, given the necessary conditions, you could get substantial justice?—Yes.

1217. No doubt there would be errors made, possibly against the men in some cases, and in their favour in others?—Most likely so.

1218. The next question is—is this a disease which would lend itself to malingering?—Yes, in the early stages, I would rather say so.

1219. You think so?—In the early stages.

1220. In that case, however, the disease would be rather of a slight character?—Yes.

1221. A man could hardly malingere to such an extent as to give rise, for instance, to a claim for compensation in respect of total disability for life?—No, Sir, I fancy that could be avoided.

1222. Would there be a danger of a large number of small and insignificant claims coming forward, three weeks at one time, two weeks at another?—Well, Sir, I could not say.

1223. There might possibly?—There might be a few.

1224. On the other hand, if a man were found to be repeatedly having some small complaint, of which the preliminary symptoms agreed in a very suspicious, remarkably suspicious, manner with phthisis, and he got some weeks off for it, and got some compensation for it, and did that over and over again, I suppose it would be open to employers not to employ him in that form of industry—the employer could protect himself from

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repeated malingering by the same man?—Yes, if he did not, he ought to do so.

1225. Assuming that this disease were placed in the Third Schedule to the Workmen's Compensation Bill of this year, and that in consequence an examination of a number of men in any particular works occurred, and it were intended to suspend at once from work all those who could not safely continue to work at this employment, would that lead, do you think, to suspensions on a large scale? Suppose, for instance, that an employer consulted a doctor and said, "Whom shall I suspend amongst these hundred men," do you think that would lead to a large number of suspensions—or would the medical man say, "Oh, you can let them continue their employment, as only a small number are likely to contract the disease?"—I do not think there would be any danger of the work being interfered with in an event like that.

1226. That seems to follow from your view that the disease is not a very prevalent one now, whatever it may have been in the past?—Yes.

1227. But if that is so we should rather have to conclude that the inclusion of this disease in the Third Schedule to the Bill is not so very formidable a matter so far as employers are concerned, provided the matter is worked fairly?—Yes, Sir, I should say so.

1228. (*Professor Allbutt.*) Let us suppose that in general practice, and in your case these cases come before you in private practice rather than in official practice in a fragmentary kind of way—and you and I are at a disadvantage in seeing cases by bits—but now supposing you had a case of this kind in a hospital under your own care in the first stage, of which you were speaking just now. Now you yourself gave us very great assistance by saying that there would be anemia, rather remarkable retention of bodily nutrition; there would be those two points, and this curious absence of physical signs, and there might also be information got from the temperature of the body, the curves of temperature taken two or three times a day usually in all cases, and from microscopic examination of sputum. I think I should almost be audacious enough to discriminate?—Oh, yes.

1229-30. I think that is Mr. Cunynghame's point of view. We could get a body of opinion valuable enough to discriminate?—I was thinking there was no other tribunal to appeal to.

1231. Do not think we are trying to put you in a difficulty in any way—I do not suppose even the physicians in Sheffield know as much in this matter as the two or three practitioners up that valley?—The matter of appeal would only be to the physicians of the neighbouring hospital. I was only wanting to say, Sir, that the physicians in Sheffield have less, or have had less, opportunity than the local practitioners up the Don Valley. A few cases might have come to Sheffield Infirmary, but most of them have been content to be treated at home, so far as I know.

Mr. W. M. ROBERTSHAW, M.B., C.M., called, and examined.

Mr. W. M.
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1243. (*Chairman.*) You are a Bachelor of Medicine of Edinburgh University?—Yes.

1244-6. You have practised in this neighbourhood?—Yes. At Stocksbridge, near Sheffield.

1247. Since what date?—Since 1893.

1248. Have you been called in by employers to examine their men occasionally?—No, not by the employers.

1249. Have you been employed by the men themselves?—I have been called in in the ordinary way as their family doctor.

1250. (*Professor Allbutt.*) You speak as a family practitioner?—Yes.

1251. (*Chairman.*) You have been medical officer to the Stocksbridge Urban District Council since 1894?—That is so.

1252. I think you also gave Dr. Birmingham some details for a paper in 1899?—I did.

1253. And you have also given information to Sir Hamilton Freer-Smith, of the Home Office, and Dr. Legge, from time to time, upon this matter?—Yes, I have.

1254. You have also read a paper upon the subject

1232. (*Chairman.*) It does not follow necessarily that the man appealed to must be a man minutely cognisant of the particular disease. Very often a person to whom to appeal, who has a very distinguished general knowledge of surgery and medicine, would be a more satisfactory appeal court?—Quite so.

1233. Assuming you have the highest science to which all doctors would bow?—I quite see now. I thought you meant men in Sheffield would be experts.

1234. I quite imagine a man up the valley would know more than the greatest professor, but on appeal he might like to place the question before an eminent man in the profession and explain his reasons for or against, and obtain a decision in that way?—My remarks were made under a misapprehension of your meaning.

1235. (*Professor Allbutt.*) Is there always a cough at the outset?—No, Sir, not always, in my experience.

1236. Does that belong to the first stage at all?—It is a later symptom, in my opinion.

1237. At what stage of the disease do you think sputum can be obtained—at the first stage or at the beginning of the second stage? It is a general question?—I would put it that you would probably be getting sputum in the later stages, but I do not think sputum is an invariable accompaniment by any means.

1238. (*Chairman.*) From your experience, do you think that a good many cases of this disease have been caused by the men themselves not being careful enough in wearing respirators?—I cannot speak as to precautions at work, because I have had no official connection with the mines, but a great many men who have died of the disease have died as the result of intemperance, lying out in the wet drunk, and that sort of thing. It has been notoriously the drunkards who have succumbed.

1239. (*Dr. Legge.*) Do you think that alcoholism would assist fibroid condition of the lung to develop?—No, Sir, I put it the other way. They suffer severe chills, go without proper food, and it helps the onset of tubercular phthisis.

1240. (*Chairman.*) Do you know whether, as a fact, the employers have often a difficulty in finding other occupations for men for whom a change has been recommended?—In my district the employer has looked after the men, even in the fatal cases, and supported them to their death.

1241. Kindly and generously. Are you aware whether or not there has been found to be difficulty by employers in this matter?—I can only speak for my own part. I have never heard any complaint from the men that they have been treated badly.

1242. If the men were claiming compensation they might themselves raise more difficulties about a change of employment than they do at present?—Yes.

of ganister miners at the British Medical Association?—Yes.

1255. You have seen a good deal of this disease?—I have.

1256. You have also made post-mortem examinations in several cases of ganister disease?—I have.

1257. And you have several patients at the present time suffering from this disease?—At the present time I have some half-dozen.

1258. In the first place I would ask you, you have heard Dr. McLaren's evidence?—Only the latter part of it. I did not hear the whole of it.

1259. You are of opinion that it is possible for medical opinion to diagnose correctly, with liability to some errors in particular cases, still upon the whole to diagnose this disease with a reasonable degree of certainty?—That is so, if the practitioner knew the history of the case; but the physical signs and symptoms in the advanced stages are closely allied to tubercular phthisis—he would have to have the history of the case before him.

1260. To be certain?—Yes.

1261. After death are you, with post-mortem examinations, better able to say?—Certainly.

1262. Does the ganister dust remain in the lung after death?—It does.

1263. And is not eliminated?—No.

1264. In the case of certain kinds of soft stone in the lung the dust becomes eliminated and disappears?—I could not answer that.

1265. But at all events the silica and the ganister remains?—It does, Sir.

1266. If you were to conduct a post-mortem examination upon a man who had died from this disease, there could be no reasonable doubt about it at all?—That is so.

1267. The microscope would tell—shall I say with absolute certainty?—Yes, I think with absolute certainty.

1268. Therefore as regards fatal cases, under the Workmen's Compensation Bill there could be no doubt arising?—I think not.

1269. And it would be impossible for a man to imitate or simulate the disease in any way?—Yes, that is so.

1270. With regard to the men at present working, suppose the duty was given to a medical man of recommending, on the ground of their liability to this disease, that a number of men at present working above ground or underground should be suspended from this employment, would the man who had to do that have to suspend a considerable number of those working at present or not?—I think he would. I think he would have to suspend a good number if he could diagnose the condition. My experience is that in its early stages the condition is difficult to diagnose. The physical signs are not marked. A man may complain of breathlessness and may have other symptoms, but when you examine his chest the physical signs are not marked. I had to examine one of these workmen for insurance, and this was only a matter of two years before he died, and yet in the course of my examination I did not find sufficient in the physical signs to recommend the company to reject him.

1271. Can you give us any notion of the number, for instance, in a hundred that it would be necessary or wise to suspend?—I could not give you any notion as to numbers. The matter has never been gone into, but I am quite sure that the duration of the disease—from the onset—is long, and therefore if one can really come to a diagnosis, and if one wished to suspend the cases early, there would be a good number that would be suspended.

1272. You think there are now a good number that ought to be suspended?—Yes.

1273. Even in more favourable conditions of work?—Yes.

1274. Then the early stages of the disease might lend themselves to malingering?—Possibly; the physical signs are not marked. Yes, possibly.

1275. But I suppose malingering by the men of any disease cannot be carried on long?—Not long.

1276. He will get a week's compensation or so, but he will not get much after that?—No. My experience up to the present is that there is no attempt at malingering.

1277. But of course the new Workmen's Compensation Bill has not been passed. The reason might appear after that?—I follow you.

1278. (*Professor Allbutt.*) When we speak of the diagnosis of a case, of course that means completeness of knowledge of its history?—Yes.

1279. With incomplete knowledge of any subject it is difficult to judge, and if these matters become matters of importance, steps would be taken to see that knowledge was organised and made complete?—Quite so.

1280. If such was the case, gradually, with the growth of information, something like a clinical picture of this disease would become well known to medical men. Now, it appears to me, from what I have heard, that there is something characteristic about this early stage in the very negation of physical signs?—Yes, that is so. In tuberculous phthisis you would have some physical signs.

1281. So that a negative may be significant of positive evidence?—Yes.

1282. There are other physical signs besides auscultation. We have heard of a characteristic *anæmia*?—Yes, Sir.

1283. And shortness of breath?—Yes, very marked.

1284. Is that an early sign?—Fairly early.

1285. So that if you saw a man walking in the street whom you had some reason to watch, you might form an opinion whether he was really short of breath or putting it on?—Yes.

1286. Do you think, as a matter of opinion, that the shortness of breath is due to the *anæmia* or to the lung disease?—I should say to the lung trouble. I did not refer to the *anæmia*, because it is common in coal miners as well.

1287. Therefore that it is pulmonary shortness of breath is a very important point?—Yes.

1288. Then you have got another disproportionate symptom, so that you have pulmonary shortness of breath, due not to the heart, nor to the state of the blood, but pulmonary in origin, a clinical picture which can be somewhat definitely established?—That is so.

1289. About this sputum. That, I think, is not an early symptom. It does not appear very early?—No.

1290. Would you say it occurred as a rule in the first stage?—Not to a marked degree. All miners expectorate to a greater or less extent.

(*Sample of sputum from a marked case produced.*)

1291. If in a well-marked case—call it an advanced case, if you please—if you find tuberculosis, this need not necessarily disturb your diagnosis of a primary fibrosis of the lung?—By no means.

1292. The tubercle being secondary to the fibroid lung?—That was well brought out in Dr. Andrews' report.

1293. In other words, this occupation may dispose to tuberculosis?—It does.

1294-6. Is there a higher rate of tuberculosis, tubercular phthisis, in the ganister districts than elsewhere?—One would have considerable difficulty in getting at that, because for years prior to the last three or four years cases of ganister disease have been certified as tuberculous phthisis or phthisis, and of course it has complicated the death returns altogether.

1297. And have you no personal opinion? You have no great confidence in giving a personal opinion about that?—I do not think that the district is markedly above the average in the prevalence of phthisis. It may be a little. Of course, statistics cannot be relied upon for the reason I have mentioned, because so many of these ganister cases were put down as phthisis formerly.

1298. I suppose it is true in the West Riding, of which I dare say you know I have some knowledge, that emphysema and bronchitis are common affections?—That is so.

1299. Can you help us a little further? We have been discriminating between tubercular and ganister disease, and especially in early cases. Do you think it would be difficult to distinguish early cases of ordinary emphysema and bronchitis from ganister disease?—Well, not very easy.

1300. It would be more difficult than in phthisis?—Yes.

1301. At what age is ganister disease apt to show itself? I suppose workers go in as boys?—Yes. I can give you here the ages at which several of them have died, and then I can go back from that. The average age, speaking roughly, is about 41 or 42 at which they die.

1302. Have those men worked in the ganister mine all their working lives?—Fifteen to 25 years.

1303. Judging by the figures I have heard in this hasty way—we will run over it quickly—would it be difficult to say that the ganister disease comes on ten years earlier than ordinary emphysema and bronchitis?—It would be difficult to say.

1304. You cannot say it occurs a decade earlier?—No.

1305. Then we are still in the face of our difficulty. With regard to emphysema and bronchitis, do you think microscopical examination of sputum would help you?—Not in the early stage.

1306. Do you get dilated bronchial tubes in ganister disease?—You do. You will find one of the deaths put down to bronchiectasis.

1307. Even then very little physical signs?—That is

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Mr. W. M. 1308. Anæmia is not very characteristic of emphysema and bronchitis?—No.

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1309. That might be a trend of distinction. I think I can only put it to you broadly, a person like yourself, familiar with these people—do you think you could, generally speaking, distinguish the ganister cases from those common cases of winter cough with broken wind?—I should not like to say I could, off-hand. I should like to make an examination, say at intervals of six months. For instance, one might find a man in winter with a marked bronchitis; if he had that bronchitis in summer I should be more inclined to the ganister theory.

1310. If there is not a distinction in respect of age, are there seasonal differences?—That is so. If I were called upon in making the examination in an early stage to differentiate between bronchitis in a miner and ganister disease, I should like to examine a man at the end of six months, or at any rate I should like to examine him during the cold weather and during the warmer weather.

1311. That and the early shortness of breath and the bloodlessness would be the points in differentiation?—That would be so.

1312. You have founded your remarks upon patients you have, or have had; is there anything more about patients you bring before us which would be of importance?—No, I do not know that there is. I dare say, if you would like it, I could arrange for you to see some of them. I understand you are going up to Deepcar.

1313. (Chairman.) We have been this morning.—I dare say I could arrange for one or two to come before you in Sheffield.

(Professor Allbutt.) I should be very glad to have an opportunity of examining them.

1314. (Dr. Legge.) Continuing the question of the diagnosis—and I am only thinking of the stage when the symptoms are so pronounced that the men begin to think of consulting a medical man; take percussion of the chest, is there any part of the chest where you find signs of consolidation more marked than in another?—Well, no; but I would say this, I do not think you would find signs in the apices as frequently as you would in tubercular phthisis.

1315. I have here a paper by Dr. Baumler, a German, in which, talking of these dust diseases, he lays stress, in addition to the apical retraction, on the dulness to be obtained by percussion of one or both edges of the lungs in their upper portions. He has found this present in several cases without apical consolidation, and mostly in cases where there have been no fever and no tubercle bacilli, and where there had been exposure to dust. At times there was, in addition to emphysema, dulness from the sterno-clavicular joint down the sternum. Have you noticed that dulness in the sternal region?—I cannot say I have.

1316. You have referred to three signs, the absence of fever, the absence of hæmoptysis, and the absence of night sweats?—I have followed out this list, and I mention that in the differential diagnosis of ganister disease from true tubercular phthisis. You practically never meet with hæmoptysis and night sweats.

1317. In the nature of the expectoration there is a marked difference?—Yes.

1318. With the fibroid condition of the lung when they first come to you and you auscultate the chest, are there any particular signs that you note?—Very frequently one gets what you would almost call tubular breathing. It is not exactly tubular, it is approaching it, and another sign is that you very frequently get a friction sound of pleurisy, pleurisy is common.

1319. Would you get this with emphysema?—No.

1320. Would not that be a means of distinguishing between emphysema and those conditions?—Quite right, it would.

1321. The inspiratory sound is prolonged?—Yes.

1322. In a very early case a man who has worked say ten years and has made no complaint at all, have you examined such a patient just out of curiosity?—No, I cannot reply to that. I may have examined one, but I do not recollect it.

1323. With regard to the vocal vibrations, have you any remark to make?—The vocal fremitus is generally increased.

1324. Is it increased in emphysema?—No.

1325. That would be another point?—Another point, yes.

1326. Would you mention the number of post-mortem examinations that you have made?—I think it is six.

1327. When I saw you in 1899 I think you had only made one?—That is so.

1328. Have the appearances been similar?—Yes.

1329. To those described?—Yes.

1330. Is that particular specimen I remember there was no signs of tubercle whatever?—No.

1331. To the naked eye?—No. No sign at all by the naked eye.

1332. And only very slight on microscopical examination, and therefore it differed in that respect from the diagram illustrated there (*produced*), which came from another specimen?—Yes.

1333. In these other lungs that you have been able to examine, were they like the condition you had at first or like this, was tubercle added to it or not?—I wish I had the reports here. In a certain number there were some signs of tubercle.

1334-5. But there were nodules, fibrotic nodules in all the cases?—In all cases.

1336. In the examinations of sputum for tubercle bacilli, was more than one examination made in each case?—Yes, the name of the patient is given, and you will find the same name recurring.

1337. I know you hold the view that this condition may prove fatal without tubercle being added to it?—Yes.

1338. Do you still adhere to that?—Yes, I do.

1339. But still you would agree that if they left off work before the disease was far advanced it would become stationary?—Yes, I know a particular case, where the man left work, I forget how many years ago, but he is able to follow certain outdoor employment now, and I am pretty certain in my own mind that if he had gone on working in the mine he would have died.

1340. It does not necessarily kill?—I think he will ultimately die of it. He is bad now. He is under treatment at the present time.

1341. As a result of the condition?—Yes, he suffers from chronic pleurisy. He has emphysema.

1342. Is he free from tubercle?—I am not quite sure. I think I may say he is free from tubercle, but I have not the report there of any sputum.

1343. You are Medical Officer of Health for the district?—I am.

1344. Are there many people obtaining relief under the Poor Law at the present time on account of this disease?—A good many.

1345-6. You have no figures?—I can get that. It happen to be on the Board of Guardians.

1347. (Chairman.) Should we be able, in the figures you were going to give, to know that the cases were cases of ganister disease?—I would only put down those that I consider so.

1348. You could put down those that you consider so. It would not be proof, it would be a matter of opinion?—I think it is correct.

1349-50. The disease is partly due to a past state of things which is passing away—the works are getting much more healthy?—There is no doubt that the mine is much more healthy. The ventilation is much improved, and I think already some result, some beneficial result, has followed.

1351. Even within a year?—Not a year. The mine has been better ventilated for five years.

1352. Have you been able to complete that table which you furnished me with?—Yes.

1353. That ought to show us whether there has been that improvement?—It varies. This table left off in 1900. I will read out the continuation of it. In 1901, two deaths, J. C. J. and W. H., miners' phthisis was the cause of death in J.'s case, and phthisis in that of W. H.'s, but he was a ganister grinder, and I think there is little doubt that he died of ganister trouble. In 1902, four deaths—E. C., 43, ganister grinders' disease; W. J., 60, ganister miner, ganister disease.

1354. Because a man has worked twenty-one years in a ganister mine you would not necessarily say that his death from consumption must be attributed to ganister phthisis, would you?—I think so.

1355. Under present conditions as well as past?—Under present conditions. I do not think it is possible for a man to work in there for twenty-one years without getting this fibrosis.

1356. You would go so far as that?—I do not think it is possible.

1357. Even with the wet process that now prevails?—Do you mean the water in the drilling?

1358. And the improved wet grinding instead of dry grinding?—I was referring more to the mine. In the mine the greatest amount of dust occurs after the blasting, and I think it is an undoubted fact that men commence to work before that dust has subsided. I cannot say from personal experience. I have never been down the mine at all, but I have had very frequent conversations with the men who work there.

1359. I suppose that could be prevented by more profuse watering, a regular spray of water until the dust was allayed and washed out of the material to be brought up?—I do not think that can be prevented altogether. After the explosion, I am under the impression that there is an enormous amount of dust which you could not deal with in that way.

(Mr. Longbotham.) He is asserting a matter in connection with mining that I should very much hesitate to do. As a matter of fact, the men are not there when the explosion takes place. The men are bound under the Mines Regulations Act to be out of the place when the shot is fired, and, therefore, they are not there when the dust is held up in suspension.

1360. (Chairman.) The doctor was expressing an opinion about the danger of the work. They are certainly out of the mine or the particular place, but they have to go in to deal with the result of the explosion; and do you say that they would go in—that by the time they went in, the dust would be entirely gone?

(Mr. Longbotham.) The dust would have subsided. It is heavy. It is granular dust, which very readily sinks to the bottom.

1361. (Dr. Legge.) With regard to those deaths of miners due to lung disease, are there included miners who have died of pneumonia?—I have not included pneumonia. This is not a complete list of miners who have worked in ganister who have died. It is a list of miners who have worked in ganister who, I think, have died from ganister disease.

1362. Are those copies of the death certificates?—Yes. Here I include bronchitis and emphysema, because I thought that was reasonable; I included one of heart disease.

1363. Are those gathered from other districts outside your own?—No.

1364. You have cited one from Sheffield?—That is included in our returns, being a death at the Sheffield Infirmary, but from our district.

1365. We have heard that a number of workmen in the Deepcar district reside at Oughtibridge?—Yes, and some in Sheffield.

1366. You do not include them?—No.

1367. So those figures are not complete in that respect?—They are only the deaths in Stockbridge Urban District.

1368. Apart from that, have you any knowledge that workers living outside Deepcar have died of symptoms due to the illness; has it come to your knowledge?—Yes, it has come to my knowledge.

1369. From what you say as to the inevitability of the disease, do you think that a limit to the duration of work is desirable?—I think it would be.

1370. Do you think, also, that a periodical examination of the workers at six-monthly intervals would be useful in helping the management to eliminate those who were liable to develop pronounced symptoms?—I think that would be useful.

1371. What do you think would be the best name for the disease?—Well, it was named ganister disease in the paper that Dr. Birmingham read before the Sanitary Institute, and that covers both the miners and the surface workers. I do not think that name could be very well beaten.

1372. That list is a list of deaths from lung disease from ganister workers in the district?—There is a ganister miner who worked elsewhere.

1373. It does not distinguish between the surface workers and the miners?—It does to some extent, because I put down here "ganister grinder," and "ganister miner."

1374. Are there any brick-setters?—No, I do not think there are. They have not described their work to that extent.

1375. Have you treated cases where there was fibroid condition and the tubercular condition both present?—Yes.

1376. Have you known of any recovery, any marked improvement in those conditions?—I cannot say that I have.

1377. (Professor Allbutt.) I would like to take you to some other passages in your *précis* of evidence. The difficulty of discrimination lies between tuberculous phthisis and the ganister phthisis?—Yes.

1378. Therefore in respect of the questions I asked you in reference to chronic bronchitis, you say that is not often a matter of difficulty?—That is the great difficulty between this and phthisis.

1379. Unfortunately it so happens we have many more points of diagnosis, have we not?—Yes.

1380. Then I should like just to carry forward a question of Mr. Cunynghame. He said "Surely there is a normal incidence of phthisis in all occupations"?—Yes.

1381. And I understand you to say you eliminated this fraction because that a man has worked in the mine for so many years is no proof that he is not still liable like other people to phthisis?—No, oh, no.

1382. You do not say that?—My point is this—

1383. We must allow for the normal incidence of phthisis in every occupation?—Yes. My opinion is this: if a man works for fifteen or twenty years in a ganister mine, I think it is impossible for him not to suffer from fibrosis, and therefore one is justified in putting that down as the primary cause of death.

1384. That is putting the thing the other way. You would not say that no ganister miner dies of tuberculous consumption?—No.

1385. It looks rather like that?—That is not my feeling at all. I have got here a list showing the years worked and duration of incapacitation. In this case there are only about three who worked nine years. All the others worked over nine years in ganister.

1386. They seem to have been mostly a long time at it?—That is so.

1387. Your average age is open to this criticism, that the extremes are very wide. One died quite early, and the other died at sixty or seventy?—Nobody at seventy; sixty-five—that was the man, a ganister breaker.

1388. There was one who was quite young?—Thirty-seven.

1389. Was that the youngest?—I do not think there is anybody younger. Oh, yes, one was thirty-four.

1390. If you have extremes, if the extremes are wide apart, your average is not much good?—The majority are somewhere about the forties.

1391. It is better for us to take that. The characteristic sputum, it comes too late for diagnosis?—That is so.

1392. It is of no use to you for diagnosis?—No.

1393. There is one other point, the length of the first stage?—Yes.

1394. Relatively long?—Yes.

1395. Did I understand you to say that it is nevertheless incurable?—Dr. Legge's question was—

1396. I thought you were speaking of any stage—even in the first stage is it incurable?—Oh, no, I would not say so. Dr. Legge's question was whether the combination of ganister and tubercular phthisis was fatal.

1397. In the first stage it might be curable?—Yes, it is hopeful.

1398. Then came Dr. Legge's question as to periodical examinations?—Yes.

1399. Would you say that the first stage may be

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a long one, extending over many times six months?—Yes, certainly.

1400. And is a curable condition?—There is a possibility of cure.

1401. Especially if the occupation be changed?—Yes.

1402. If the occupation be changed at a later stage then you would say that the life is permanently deteriorated even if the man should change his occupation?—Yes, that is so.

1403. (Chairman.) The opinion you gave, that a man could not work more than twenty years in the ganister works without disease, only applies to a mine, not to a ganister grinding factory?—As the ganister grinding used to be done it would apply to that. As it is done now, I should not like to say that. I should not like to say there is no chance for him.

1403*. That statement might be possibly met by the production of a man who had as a fact worked twenty years—between twenty and thirty years—in a mine?—I should like to see him. I do not doubt that such a man might be produced, but I do not think it possible that he would not show signs of disease.

1404. You are speaking of a ganister miner. When you come to grinding on the surface, you would not make the same statement?—No.

1405. You are therefore still of opinion that at the present time working in a ganister mine is not an occupation that a man ought to spend the whole of his life at?—I think he ought not.

1406-7. What is the number of years you would prefer to put as a limit to work in a ganister mine?—I do not think I could answer that.

1408. Would it be better that the men should work in the mine at the younger or the older stage? Is there anything in the system which would render them less likely to take it from a certain age, thirty-five, than when they were twenty?—I should say that if a man went into a mine, say when he had got to middle life, his chances would be better than if he went in as a youth.

1409. Would it be possible to avoid the dangers you speak of by alternating periods, say a year down in the mine and a year at some profession where you had no dust, and back to the mine again?—I think that would be an advantage.

1410. In your view, it would be almost essential that there should be some limitation, I do not mean necessarily statutory limitation, but in practice some limitation to the period of work underground, or else some alternation of it, unless all the men are to die of ganister?—Quite so.

1411. As a matter of fact, do a great many men spend twenty years in the ganister works, or do they change their occupations?—A good many men have spent twenty years in the past.

1412. Since, however, attention has been called to this disease, I suppose there are less. The men's attention has been rather called to the care of their health?—Yes; but I do not think they study it by any means sufficiently, and they stick on at the mining. The majority of them do. In this list I have men 20, 25, 21, 20, 27—this is showing the number of years worked by forty-seven of these men, of miners and grinders.

1413. Of the men whom you have examined?—Most of them are dead.

1414. An arbitrary list of men you have known?—I have not known them. I have looked up the lists.

1415. What lists?—The lists of deaths.

1416. Those men are all from the parochial returns?—Most of them from the Registrar's returns. One or two of them are living in the Stocksbridge Urban district. Mr. Bettany sent me a request that I would find the number of years the men have worked in the ganister trade, and also the length of incapacitation involved by the disease, and this is the result.

1417. These are all deaths?—No; some of them are living. This column shows the number of years they have been incapacitated.

1418. Did these men all die at the infirmary?—Most of them at home.

1419. Was there any post-mortem examination in many of these cases?—Yes, in the cases I have marked (marking cases in list).

1420. Those are certainties?—Yes.

1421. (Dr. Legge.) In any case where you have suspected this disease and had a post-mortem examination, have you ever failed to find it?—No, oh, no.

1422. (Professor Allbutt.) You were right in all those cases?—Yes.

1423. (Chairman.) Is this a very skilled occupation, or where a man could change from this to something else? One of the cases was of a man engaged in clay work; how did he get ganister?—He would not get ganister disease; but the fire-clay might give rise to dust disease of so closely allied a nature that I thought it wise to include that.

1424. There is some silica in the fire-clay, but we ought perhaps to exclude that case?—Certainly. I may say, however, that this man was certified by another doctor as dying from fibrosis of the lung.

1425-7. (Professor Allbutt.) I may interpolate the question—are they to be taken in respect of alcohol, pretty much on an average with other trades?—I do not think they drink more than the average workmen; but I think that in that particular district of Stocksbridge and Deepcar possibly some of the workmen higher up the valley are exceptionally temperate, and therefore apparently these men are perhaps not so temperate.

1428. (Chairman.) On the other hand, it may be fair to say that the men who have succumbed may be themselves abnormally alcoholic. You or the last witness said that was a possibility, and a cause of their more early succumbing. The fatal cases I presume would, on the average, contain a larger proportion of alcoholic ones. It seems to follow almost as a necessary conclusion?—Yes. Of course, they do not do that during the latter part of the time. They cannot afford it; they have not the means. They are off work for periods varying between one and six years.

1429. I am speaking of the period just before they get off work, the cause that gets them off?—Quite so.

1430. (Professor Allbutt.) The alcohol makes them more vulnerable?—Yes.

1431. (Chairman.) And it is only fair to say that a certain number of those fatal cases have been assisted by alcohol?—Yes.

1432. (Professor Allbutt.) And then we might say, is that liability higher amongst ganister miners than amongst average miners?—No.

1433. Supposing an insurance office were insuring two men, one in ganister and the other not, are you able to give us any conception of the difference of premium that they would feel compelled to charge as to lives that were otherwise equal?—I do not think that matter has been dealt with. The men have their insurance. They are insured for small sums, and for a mere £10 or £15. If the man is healthy at the time when he is examined, I do not suppose a report would be made to the insurance company that he is working in ganister.

1434. Have you any figures in your mind? If you were forced to make a calculation, could you get them out, or do you think it is too doubtful?—I could not answer that; but I can say this, that I happen to be surgeon to the Order of Druids, and I recommended the Druids and the Rechabites to exclude altogether from their membership any who do work in a ganister mine.

1435. Did the Rechabites adopt this advice?—I cannot say that it has been rigidly carried out, but they quite agreed with the necessity of doing something of that kind. It has been a drain on the clubs.

1436. They considered that there was an appreciable extra risk?—That is so.

1437. Then this kind of liability to this illness is one which seems to me singularly capable—if it could be dealt with—of being dealt with by some good form of insurance, and if the Workmen's Compensation Act provides it, some form of joint insurance would be the best way of dealing with it, if it were possible to do it?—I should think so.

1438. So as to avoid disputes as to the true origin of these diseases. You have had experience of insurance work. Would it be a great, onerous task upon employers if an Act were brought in to provide for compensation being payable to those workers who were incapacitated by ganister disease?—I do not know how these matters are worked, and I could scarcely answer

that question. These are the number of men who have died annually of this disease—4, 5, 2, 4.

1439. But that is not a very large number amongst those who have worked. That is decidedly small?—Yes, quite so. There are others who have died outside; but, taking this as a standard, I should think that the burden would not be intolerable.

1440. That is very elastic. I suppose we cannot get to anything like figures?—I am afraid not.

1441. (*Chairman.*) I should like to ask whether the certificates of death are signed by yourself?—Some of them.

1442-3. The majority of them?—I could not answer that off-hand. It is possible they may be. I have a moderate practice up there, and it is possible they may be.

1444. Supposing, at present, you saw a number of men who had been working down in a mine, say 14 or 15 years?—Yes.

1445. Would you expect to find ganister disease to a certain extent amongst them?—I would.

1446. In all of them?—Yes.

1447-8. In all?—I would.

1449. You go as far as that?—If they had worked in a ganister mine for an unbroken 15 years.

1450. To what extent?—I should not expect to find it so that the man was incapacitated, but I should expect that a skilled medical man would find undoubted signs of fibrosis.

1459-60. Did these three deaths out of 350—were they probably or possibly ganister deaths?—I think they would be more advanced than others?—Yes.

1452-3. (*Chairman.*) In these bad cases which you mentioned, for how long a time were the persons affected incapacitated?—One had been off work for two years, another had been off work for five years, another a quarter of a year. I am not able to speak from memory as to the remaining three.

1454. Of two men normally like one another, working under the same conditions, I suppose you would not say that they would necessarily exhibit each of them

signs of fibroid phthisis at the same period, after the same period of work?—Quite so. They would vary.

1455. According to the strength of the man?—But I do say that I should expect to find it in any man to some extent after 30 years. My opinion respecting the number of years in which a man would be likely to exhibit signs of ganister disease is derived from my particular district. I have no right to speak of other districts. Ganister differs in quality, so I am told. I had better say that.

1456. Now, as to the number of men affected compared with the number employed?—This is a difficult problem to solve, because a considerable number of men at present working are to some extent affected with the disease. I may say that at present there are employed at one of the works about 200 men and boys above ground and 150 in the mine. At the present time I know personally of six former workmen of this firm who are incapacitated. Of these, four were surface workmen and the two others worked in the mine. Accepting these figures as a standard, this would give the number of incapacitated men, compared with the number of employed, as 1·7 per cent., but these figures would need correcting on the side of the incapacitated, as there may be men who are incapacitated who are unknown to me, either because they live in some other district—for I may say that a considerable number of these workers live in the neighbouring villages, and some even in Sheffield—or because living here they are under the treatment of some other medical man or hospital. The deaths for this year so far, excluding that man who was a clay grinder and who, therefore, you thought should perhaps be excluded, are three.

1457. Three out of 350?—Three out of 350.

1458. 1 per cent?—75 per cent.

1459. Did these three deaths out of 350—were they probably or possibly ganister deaths?—I think they were. I can give you from memory who certified these. Here is one, T. B., ganister miner, ganister miner's disease, certified by Dr. Mossman. C. H., sixty-five, ganister grinder, fibroid phthisis—that was certified by my colleague, Dr. Robertson; and J. K., fifty-six, ganister worker, ganister disease, that was also certified by Dr. Robertson. Therefore it is not three out of 350. None of these were certified by me. Dr. Robertson is my assistant.

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SIXTH DAY.

Friday, 16th November 1906.

PRESENT:

Mr. HENRY CUNYNGHAME, C.B.
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.
Mr. T. E. BETTANY (*Acting Secretary*).

Mr. SIMEON SNELL, F.R.C.S., L.R.C.P., called, and examined.

1461. (*Chairman.*) Mr. Simeon Snell, I think F.R.C.S., Edinburgh?—Yes, Edinburgh.

1462. I think you are ophthalmic surgeon to the Sheffield Royal Infirmary?—I am.

1463. And Professor of Ophthalmology at the Sheffield University, and I think you have written some books, have you not, on various topics?—Yes.

1464. And amongst others one upon miners' nystagmus and several papers?—Yes.

1465. You have studied this particular subject for over thirty years?—Yes.

1466. I suppose it is in your capacity as ophthalmic surgeon that the matter has come to your notice?—Yes.

1467. And you have seen a good many cases?—A very large number.

1468. You have visited collieries and examined the men there?—I have.

1469. And have also seen a large number of patients who have been suffering from the disease?—I should think more than a thousand.

1470. Those are men?—Yes.

1471. (*Professor Allbutt.*) Affected, you mean?—Yes.

1472. (*Chairman.*) What first attracted your attention to this particular disease. I understand that it has been diagnosed and examined by you more than by anybody else?—I think so, as far as England is concerned.

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Mr. S. Snell, 1473. What first attracted your attention?—My attention was first attracted to the acquisition of it by the fact that men coming under one's observation belonged to a class who had to perform their work lying more or less on their sides. After that I went down a mine and made myself familiar with the working of a coal mine. I then found that the work pursued by others underground necessitated the same strained position of head and eyes as did that of the coal getter when lying on his side and under-cutting the coal.

1474. Do you mean that it is the lying on one side that affects the muscles, and produces this disease?—These men that I spoke of first were all coal getters whose work necessitated their lying on one side or the other to get the coal.

1475. Do you mean that persons who spend a large portion of their lives lying on their sides in getting coal would get it?—In under-cutting (holing) the coal the head is thrown back and the eyes are directed upwards.

1476. (*Professor Allbutt.*) Would the witness begin by saying on account of what discomfort or symptom the miners first came to him? Coal getters throwing back the head and directing the eyes upwards?—More or less obliquely—more or less obliquely upwards. A miner comes under treatment because he complains of giddiness, but usually the most prominent symptom is that he notices that everything dances in front of his eyes. I first noticed that the men under observation were men all doing one kind of work, necessitating lying on the side and directing their eyes upwards. Then I became familiar with the mine, and I found that in other occupations underground, in fact, most occupations, there was the same sort of affection in men who did not lie on their sides, but were engaged in occupations which involved a more or less similar position of the head and eyes.

1477. There might be other men?—There are other men. I have brought you a man to show you who does not lie on his side.

1478. Are there any persons who lie in that attitude except the coal-getters?—No.

1479. This position is observed only by the coal getters?—Yes. As to the others, as one became more familiar with the working of a coal mine, one noticed that there were other men in the pit who were compelled by their work to put their head and eyes more or less in the same position as a coal getter, although they

were not lying on their sides. That is a great deal the consequence of low working places, the lowness of the roofs.

1480. Due to low roofs?—Yes. If a road is 4 feet 6 inches high and the man is 5 feet 8 inches high or even only over 5 feet, he has always to be walking along in a stooping position (making a movement in illustration) and his eyes are directed above the horizontal line.

1481. That is like the overlooker, the picture in your book?—Yes, the deputy. Of those working underground, the greatest proportion will be coal getters. In my district from 20 to 30 per cent. of those working at the coal face will be engaged in coal getting and holing. (*Witness produced several photographs of miners at work.*)

1482. (*Professor Allbutt.*) Now, you have shown us the photographs upon which your observations are going to be based. Will you go on giving us in such order as you think fit your further remarks?—My observations led me to conclude that the cause of this miners' nystagmus was the position in which the eyes were cast for long periods together, inducing a weariness in what we call the elevator muscles analogous to fatigued conditions in other muscles like writers' cramp—and others.

1483. And wry neck?—Yes. And then, also in support of this, these miners suffer from other muscle troubles. A man with miner's nystagmus will frequently exhibit a sort of thrill in the head if the hand is placed on it. In other cases there is a very marked tremor of the head. You can see it—and there are tremors of the muscles producing torticollis.

1484. Might I take it practically that all persons working in narrow places, even overlookers?—I am coming to the deputies. It applies to the whole system of working in mines, to the pony boys who push the trucks along, and so on, as is seen when once the whole working of the mine is grasped. The deputies suffer occasionally, and the onsetter who works in a good light at the bottom of the pit, and who is constantly watching the cage ascend or descend. I have said nothing about the frequency of these oscillations. They may be 100 or more in a minute. I have seen them as frequent as 300 or 350.

1485. The oscillations vary?—They may be 100 to 150 a minute, and I have known them as much as 300.

JOHN PRESTON, called, and examined.

Mr. J. Preston.

1486. (*Mr. Snell.*) Why did you come to me on Tuesday?—Because I could not go on with my work on account of my eyes, because of the staggering. I had only been there about nine months.

1487. You came to me because you could not do your work, and the reason was because you noticed everything dancing and jumping before you?—Yes.

1488. When you were working especially?—Yes.

1489. Did you suffer from giddiness at your work?—Sometimes; not always, but my eyes were going like this with the light. The light was behind me, and the work above me.

1490. (*Chairman.*) What work was the witness doing?—Ripping.

1491. What were you saying about the work above you?—I was looking above me all the time.

1492. How long had you been ripping?—Since last March.

1493. What were you doing previously?—In a thin coal seam.

1494. Holing?—They were machine got coals.

1495. Electric machine or air?—Air machine.

1496. Were you working where there was room for you to stand upright with the machine?—No. Where I worked, it was about 2 feet 9 inches. I filled the coal after the machine had got it.

1497. You do not work the coal yourself?—No.

(*Mr. Snell.*) This man's work was ripping, or stone work?—Yes.

1498. Above where the coal is to be got, he has to rip the dirt off—stonework?—Yes.

1499. What height are you?—Five feet 6 and a half inches.

1500. (*Chairman.*) What height is the place you have got to work in?—In the bank where I work it is 5 feet 6 inches, floor to roof, and it lowers from 5 feet or 5 feet 6 inches, the height to start with, and as you go along you rip it 2 feet.

1501. What is the height of the place you were mostly in?—Five feet it starts with, and there are 2 feet of ripping.

1502. You are 5 feet 6 inches high and you work a place 5 feet?—Yes.

1503. (*Chairman.*) Then you begin work with the head down?

(*Mr. Snell.*) It is a 6 foot gauge from side to side. As they shift up in the face, in the bank, as they get the coal out of the bank, they shift up from time to time and that leaves a certain amount of ripping—as a rule two yards it is—and they send two men there to do that. With a start there is a 2 foot face of ripping and a lot of bottom left, and they finish at 7 feet as a rule and a little more sometimes.

1504. (*Chairman.*) The part you have to rip off is 2 feet thick?—Yes.

1505. (*Chairman.*) Now we want you to say when you first began to feel troubled with your eyes?

1506. (*Professor Allbutt.*) You were working 5 feet and putting out 2 feet more. You were working over your own head?—Yes.

1507. While you are doing this you are standing up all the time?—You are not bent at all.

1508. (*Mr. Snell.*) Are you looking up the whole time you are working?—Yes.

1509. That is to see the roof where your tool is going to strike. Your eyes are directed upwards towards the roof all the time?—Yes.

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1510. (*Chairman.*) When did you—you began to work in March—when did you first begin to feel at all uncomfortable?—Four months ago, and I gradually got worse.

1511. Four months ago—that would be about July?—Yes.

1512. About July what did you feel, what did you feel about four months ago?—First time I noticed it, I was turning round to my light, and I could not see it at all.

1513. Turning your head to the light, you noticed that you could not see?—Yes.

1514. Anything else did you notice?—When I was striking my wedge, I could see a lot of wedges.

1515. You could see, but saw a lot of wedges, all confused before you?—Yes.

1516. Did you go to a doctor?—I kept playing a day now and again to see if it would get better. I thought it was gradually getting worse, so I went to the doctor.

1517. What month?—A week last Monday.

1518. You went on trying to work for some two or three months?—Yes.

1519. Did you earn a full day when you were trying to work?—I was getting my full wages.

1520. It is day work?—I work for a contractor.

1521. You were getting your full pay? You went on and did you find yourself getting worse?—Yes.

1522. How many days have you been off work, unable to earn during the last four months or so? I think you said you were getting full wages?—I got wages for my day's work.

1523. You only got wages for your day's work. How many days were you off in consequence of this after you first began?—About ten.

1524. About ten days in consequence of your eyes being bad?—I am not sure just to the day.

1525. Roughly you missed about ten days' work after June?—Yes.

1526. Then about three weeks ago you felt so bad that you went and consulted a doctor?—No, Sir, a week last Monday I went to the doctor.

1527. I see. You still had the same feelings?—Yes, Sir.

1528. Do you feel those sensations when you are not in the mine now?—When I sit down my eyes swim. (*The witness sat down in a chair, but hastily rose.*) When I sit down in the light my eyes swim.

1529. When the light strikes you direct?—Yes.

1530. Would a light overhead strike you more than any other light?—If I look up at a light I feel bad.

1531. Do you mind looking at a light below you?—I have not been that way this last fortnight, but when I was working, looking down after looking at the light so much, my eyes seemed to burst.

1532. Looking downwards, you feel it too, do you?—Yes.

1533. You feel it looking downwards?—Yes.

1534. Looking downwards also you feel a certain amount?—In the mine looking down is just as bad as looking up.

1535. You feel just as bad looking down as up?—It came after working at the hammer and wedge all night up to then—then I had to start and stoop and shift the dirt, and it was just as bad then as when I was looking up above.

1536. Looking steadily at the light for some time also, that hurts you, is that so?—Yes. In the pit the light was always behind me, hung at the side of your work, on the stone work you were striking at.

1537. When you look down you have a light right in your eyes?—No, it is hung on something.

1538. You seem to have a pain also from having the light straight in your eyes as well?—Yes.

1539. (*Professor Allbutt.*) Which is the worst of these attitudes?—Looking up is the worst.

1540. You have been doing previous work before that?—Oh, yes.

1541. Did you in all your previous work get this dizzy feeling?—No, Sir.

1542. What was your previous work?—Filling coal out of the machine.

1543. How high is the headway in that place?—I did not work in the ripping there, I worked in the banks.

1544. How high was the place you were working in above your head?—I had to kneel, two feet nine inches.

1545. That was very low, and you were filling coal?—Yes.

1546. Had you to look up or down?—You are on a level with it all the time.

1547. Not to look up?—Not much.

1548. To what do you attribute your condition? If you were asked what was it that gave you this, what do you think did it?—I think myself it is with looking up at my work above me all the time.

1549. Then you were not looking up so much when you were filling before you began this business?—No, your coal was dropped on the floor and you were in a more natural position.

1550. Any pain in the muscles?—A pain behind the head.

1551. Did you feel ill in yourself with this condition?—No, Sir.

1552. You feel quite well?—I feel a bit off.

1553. You are naturally worried at being disabled; but apart from that mental annoyance, your bodily health would be good?—Yes.

1554. Supposing we could put your eyes right, you would be right?—Yes.

1555. It does not produce any feelings of general ill-health?—No.

1556. (*Dr. Legge.*) Did it come to you as a strange thing?—Yes, at first.

1557. Had you seen any men with this same condition before?—Yes. I do not know about the same condition. I had a brother off—a ripper—about eleven months.

1558. (*Mr. Snell.*) You are familiar with this as a frequent thing?—Yes.

1559. (*Dr. Legge.*) Did you recognise it as a common complaint amongst miners?—No, I was a bit afraid when it came upon me.

1560. (*Chairman.*) And did not recognise it?—I thought it was something very serious.

1561. (*Mr. Snell.*) Were you not familiar with miners suffering from it?—No.

(*Mr. Snell.*) The witness came to me as if he knew all about it.

1562. (*Professor Allbutt.*) Have you any headache?—Only now and again, at the back of the head, once or twice.

1563. Not more than anyone else; you do not attach much importance to it?—I have it now and again.

1564. Have you had more headache when working than when not working?—No, Sir.

1565. What do you do at home, do you sit and read the paper?—The doctor told me not to read, I do not know what to do.

1566. What do you do?—I read magazines now and again.

1567. Do you read anything else?—Yes.

1568. What?—Books.

1569. Can you read a newspaper as well as a book?—Sometimes. If I read too long it seems to start me.

1570. Can you read for an hour?—Oh, yes, I should think so.

(The witness, Preston, then retired, and examination of Mr. Snell was resumed.)

1571. (*Chairman.*) How long will it be before the last witness will get right?—I could not tell you. He has been off work for a fortnight. He may be better in three or four weeks; it may be months. It is almost

impossible to say. This man I had seen for two or three minutes only three days ago, but he seemed very intelligent, and I thought if I were to show you anybody he was just the man. He is very much better in

Mr. S. Sne
F.R.C.S.,
L.R.C.P.

Mr. S. Snell, himself than many of them are. He has no anæmia.
F.R.C.S., He makes no other complaints, a very honest, straight-
L.R.C.P. forward man.

16 Nov. 1906. 1572. (*Professor Allbutt*.) May we take it from you that the general health is unimpaired?—Yes.

1573. Is there any special idiosyncrasy about the cases?—I do not think so.

1574. Given the same amount of stress, it would affect men much alike?—Yes; though some would be longer than others before becoming affected.

1575. There is no great difference?—No.

1576. With the ordinary healthy man a certain amount of strain of this kind would pretty surely be followed by nystagmus?—In a very large proportion of them.

1577. Is there any important idiosyncrasy in these cases?—Not specially so.

1578. How far are refractive errors—astigmatism and other refractive errors—concerned in the causation?—I do not think so, I have worked it out very carefully.

1579. You think not?—No. There is a peculiar point about these men. Here you see a man with the oscillations very marked. He is speaking absolutely truthfully. He could not do his work. I could give him a certificate to that effect. You may find a man with oscillations just as marked, and yet he is doing his work. It gets into a chronic condition, and yet a man goes on with his work apparently without distress.

1580. They feel nothing?—They go on with their work. A miner comes with a slight injury. His eyes begin to oscillate directly he looks upwards, but he may have been working that day. In another case you have to provoke the oscillations by putting the man in the position assumed at his work and yet he may have very distressing symptoms.

1581. Briefly, there is no direct relation between the amount of the nystagmus and the suffering of the individual?—No, or very little.

1582. Or the incapacity of the individual?—Yes, that is so.

1583. That is the result of your experience?—Very light cases are sometimes very distressing, and very severe ones not.

1584. Is there any compensatory process which may neutralise or ameliorate the condition in any way?—Yes, in walking above ground they get into the habit of throwing the head back. A man will come to me in the out-patients' room. It will be seen at once at the door that he has nystagmus, for he is keeping his head back and his eyes down.

1585. That is the only compensation?—That is

1586. None in the eye machinery itself?—No.

1587. This takes us very easily on to the question of prognosis: what should you say is the prognosis in this man's case?—A good one.

1588. Can you give us something like the number of weeks or months approximately—will he be well in six months?—Three months—some hang on for months.

1589. Three months absolute rest from mining?—Yes.

1590. And kept from any occupation within a mine?—Much better for it.

1591. But he might do bank work?—Yes, in a few weeks.

1592. (*Chairman*.) Will he be able to go into the mine?—That man may have some oscillations and yet feel so much better that he will go back and work for a period even if he breaks down again later on.

1593. (*Professor Allbutt*.) Do you advise him to go back to work?—Not for several weeks.

1594. Suppose the employer says he shall have any time you desire for him, say six months, would he then go back cured?—I could not be certain he would not break down again in another six months.

1595. Supposing the man to possess £1 a week himself, you would advise him to stay away six months?—Yes, and if he is a younger man I should give him this advice, I should say, "Now, look here, you are a young man, if you can do your work go and do it for the present and look out for a different occupation."

1596. I have not got my point. Supposing you had a free hand to give him such rest as you thought fit, and

then he comes back to the mine, would he come back in the position of a man who had never had nystagmus, or would he be more likely to break down than he was before?—More likely. The advice I should give him would be this—"You say you are much better, more fit for work, can you get some work on the bank? Go and see the manager and get some work on the bank for a time or permanently." Then I should say, "If you do go back to the mine with the same conditions, sooner or later you may have a return of the old thing."

1597. Is he likely to find it return in a shorter time?—He would be more likely, for I think the oscillations once produced generally do not entirely cease, and the liability to their recurrence is certainly greater after they have once been produced. My difficulty in answering this question is, I do not recollect having seen a man suffering like this man coming back to me five or six years afterwards, and saying, "Since you saw me before I have never worked in the mine." I have never had a case of that kind to compare with.

1598. You say that many old hands have oscillations, though making no complaint?—Yes.

1599. If you sent this man back to the mine after such a long rest as we are supposing, is there any hope that if not cured he might get into a chronic oscillatory stage which would not materially interfere with his work?—I think so. That is the point I want to enforce.

1600. It is not necessary then that he should abandon his work?—No—not always.

1601-2. He might get habituated to it?—Yes, suppose I went to a colliery and examined all the men. I went to a candle lighted pit, and I found that six* of those men were absent from their work on account of miners' nystagmus, but there were a large number of others that were affected and made no complaint of it, I will not say made no complaint, but were pursuing their occupation.

1603. Do you think that many of them do suffer in some slight degree, not so much as to take them off work, but so much as to lead them to seek compensation if they had the opportunity?—The number who would seek compensation would be very large. You could not separate the genuine from the others. That is the very great difficulty.

(*Chairman*.) That is the difficulty, you see.

(*Professor Allbutt*.) They are all genuine, you mean the incapable.

(*Mr. Snell*.) I mean the incapable.

(*Chairman*.) The difficulty is to separate the incapable from those who think themselves incapable.

1604. (*Professor Allbutt*.) They have all got nystagmus. Have you any idea of what percentage of the colliers, capable or incapable, present nystagmus?—I have no exact statistics. I believe it has been stated that 30 per cent. suffer from it more or less, but I do not guarantee the accuracy of these figures.

1605. (*Chairman*.) It is not an invariable accompaniment of mining work where a man looks upward—some men can do that without getting it?—I am sure they can.

1606. It follows apparently from your answer that probably two-thirds of them could do this kind of work looking up without getting it?—The men most liable are about thirty per cent. working at the coal face.

1607. And out of those one in three gets it?—Most of these. I have no data to go upon exactly. When I wrote this book I published a chapter on prevention. I was under the impression that if they got coal getting machines, that might assist, but with the evidence that this man gives, and other men have given to me, the conditions of work are not improved, as I anticipated would be the case.

1608. In talking of prevention, would it be possible to wear any form of spectacles that would enable the rays to be deflected by them?—It is the muscles that are affected.

1609. A prism?—I see what you mean.

1610. Possibly it would be impracticable to use anything of that sort?—Yes. It is not easy to see that there is anything to be done in that way.

1611. I will put it this way, Mr. Snell, if these men were entitled to claim compensation who are suffering

* 350 men were employed, and out of these 150 were stallmen, thus 3½ per cent. of those working as coal getters were off work.

from this disease, it would mean a very large number of claims amongst the miners?—Yes.

1612. And might lead, in fact, I think I might say logically, probably would lead, to only one man out of two in the average of mankind being capable of carrying on the trade of mining in low mines?—Well, I would not say quite that. I have not got the figures exactly. I think it would lead to the withdrawal of a large number of the men from the mine unless they were determined, like they are now, without excuse to go on with their work. Many of them who are suffering would go on with their work, getting £2 a week rather than £1 a week compensation, or 38s. a week rather than 19s. a week compensation.

1613. Many men for the sake of the wage would put up with it?—And many of them would continue their work as they do now and not experience pain or difficulty from the disease they have got.

1614. (*Professor Allbutt.*) That in your opinion is rather a large proportion?—A very large proportion.

1615. The affected men, but not the suffering men?—It might lead to a large number of men who are able to do their work seeking compensation.

1616. (*Chairman.*) This then is a disease which it is not difficult to diagnose, but it is very difficult to say how far it should be held to prevent a man carrying on his occupation?—Yes.

1617. (*Professor Allbutt.*) To put it in technical language, there is no definite relation between the objective and subjective symptoms?—That is so. Objective symptoms are apparent. For the subjective you have to rely on the man.

1618. (*Chairman.*) And then it is very difficult to say whether it is reasonable for a man to go on with his occupation and bear it?—I do not know whether you can say this. If I were put into the witness box and asked "Can this or that man be said to be incapable of work or not?" I should have great difficulty in answering in the majority of cases, and the only answer I could make would be that I have seen men suffering who are still pursuing their work. On the other hand I have seen many instances of men affected who seem to be absolutely speaking the truth when they say they are incapable.

1619. (*Professor Allbutt.*) Suffering or merely affected?—Affected.

1620. (*Chairman.*) And yet seem to be speaking the truth when they say they are unable to follow their employment?—Yes.

1621. The truth is this, then, that you would perhaps hesitate if you were deciding the matter before putting this disease down in the third schedule of the Workmen's Compensation Bill?—I have thought that over for some time, and I do not see how you are to do it. I have been considering this question rather carefully and I am bound to say that if this disease were put purely and simply into the third schedule of the Workmen's Compensation Bill, it would apparently necessitate altering the whole system of coal mining. The roads for instance, instead of being four feet or four feet six inches would have to be made much higher.

1622. Then I will put it generally, Mr. Snell. Speaking in the interests of the men, on their side, do you feel doubtful whether it would be good policy to have it put down into the schedule?—Well, of course, during the time they are disabled like this man, if his wages are 38s., he would get 19s., whereas at present he may only receive 10s. a week from his club. It would be so much better in this way.

1623. Looking at its general effect on the industry?—It would not be good from the men's point of view nor from the employer's. I think it would throw so many of them out of work. It would, I think, add enormously to the cost of coal getting on the one side, and it might throw a lot of men out of employment. I have done a lot of compensation work in all classes of workmen, and numbers of these men belong to several clubs, and many of them when off on compensation get more than they would at work. I know men at 30s. a week getting £3 16s. a week from benefit societies and compensation. All these things add greatly to the difficulty of it.

1624. What I wanted to bring out is that in your opinion it is not a mere question for the employer. It is also a question that might react unfavourably upon the men?—I think so.

1625. And one in which considerable care ought to be

taken in judging what to do?—Yes, I think it is a tremendously difficult question myself if you were to put it in the schedule.

1626. One other question. Are there other trades than mining where something of the same kind is produced?—Yes, I was going to refer to that, if you allow me now. The first case that I saw of the sort was a compositor working in the "Telegraph" Office just down here. I went to follow him at his work, and he had to cast his eyes upwards when getting the type. Since then I have collected together twenty-one cases. Six of these were compositors, two were metal rollers, and there was a platelayer, a plank cutter, a saw maker, a sanitary tube maker, a fitter, an iron founder, a worker in a "cage," two glass workers, a youth in a confectionery warehouse, a man at the screens on the surface of a coal mine, a blacksmith, and a man whose duty it was to hang up harness. The platelayer, whose case came to the notice of a friend of mine, was a middle-aged man acting as foreman over platelayers, and it was his duty to look along the rails to see if they were laid truly in line. He had to bring his head to a low level, and had to rotate the eyes strongly upwards. My friend said: "I made him show me the position in my room." He further says, "I was puzzled at first, for he had normal vision in both eyes, and nothing to be seen amiss; but on learning the precise nature of his work and questioning him further I learned that his trouble was that objects danced before his eyes—no doubt nystagmus brought on by the position."

1627. Have you ever had complaints with regard to plasterers of ceilings or decorators of ceilings?—Yes, I have referred to this in my book and my papers. It is historically true, I believe, that Michael Angelo suffered from a weariness of his eye muscles if not nystagmus. Michael Angelo, after his great work of decorating with frescoes the vault of the Sistine Chapel, which he accomplished in eighteen months, suffered from the discomforts attendant on the strained attitude he then assumed, and from looking upwards at the vault. He worked on a special platform, and he wrote a sonnet describing his position. The artist drew a caricature of the position he had to occupy on the scaffold. I have not been able to get a copy of the drawing, but this is the sonnet from Mr. John Addington Symonds' translation:—

"I've grown a goitre by dwelling in this den,
As cats from stagnant streams in Lombardy,
Or in what other land they hap to be—
Which drives the belly close beneath the chin:
My beard turns up to Heaven: my nape falls in
Fixed on my spine; my breast-bone visibly
Grows like a harp; a rich embroidery
Bedews my face from brush-drops thick and thin.
My loins into my paunch like levers grind:
My buttock like a crupper bears my weight;
My feet unguided wander to and fro;
In front my skin grows loose and long; behind
By bending, it becomes more taut and straight;
Crosswise I strain me like a Syrian bow:
Whence false and quaint, I know,
Must be the fruit of squinting brain and eye:
For ill can aim the gun that bends awry.
Come, then, Giovanni, try
To succour my dead pictures and my fame,
Since foul I fare, and painting is my shame."

1628. That you mean is descriptive. Is it a poet's description of what he felt?—It is known that he suffered from his eyes.

1629. In respect to the next question, the truth is then, Mr. Snell, that this is not a specific disease of a specific occupation so much as an incapacity produced by a peculiar use of the eyes in any occupation?—Only other occupations do not require such prolonged strain and do not produce it to the same extent, therefore, as in mining. In mining the conditions are particularly favourable for the production of nystagmus. Might I just refer to some cases, particularly to the point, in a paper which I read to the Ophthalmological Society in London. I got permission to examine a man with a friend of mine. This was a man working in a bad light. He was a cab cleaner. I found out that he had given up cab cleaning at my friend's desire, but he still pursued other work, and the nystagmus was still very marked. His occupation had formerly been that of washing cabs. This he had for some time relinquished, and had been taking money and entering the amounts received. I had permission to ask any questions I desired, and it appeared that he hung up a

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Mr. S. Snel, great deal of harness. I found out the interesting fact that when cab cleaning he had also to hang up many sets of harness. This he had continued to do up to the time of my seeing him. Every night he hung up as many as fifty sets of harness, which occupied him for about three hours. He was a man of 5 feet 7 inches and he had to reach the harness up to a height of 7 feet or more, and to see that each portion of the harness was properly placed on the rack, and turned his eyes directly upwards. This he demonstrated to us, and he also asserted that he found this upturning of the eyes very distressing. The explanation for the onset of the nystagmus and for its continuance in spite of a change of work in other respects was thus fully explained. The position the man assumed closely resembled that often required of a deputy in a coal mine when examining the state of the roof.

1630. (*Professor Allbutt*.) Your cases are all elevator cases?—Yes.

1631. Lateral movement?—I think there are cases of lateral movement.

1632. Occupations do not demand it so much?—No.

1633. Apart from organic disease of the nervous system, and apart from the occupations, have you any cases of nystagmus unaccounted for?—No.

1634. (*Chairman*.) How many men should you say per cent. would be incapacitated from work by this, what proportion of the men engaged?—I do not think it is a very great proportion.

1635. It would be small?—Yes.

1636. But as you have told us, very difficult to draw the line as to who is incapacitated and who not?—I do not think myself it is a very great evil. It might be considered a great evil under compensation.

1637. If it were made a subject of compensation, it might be made a subject of compensation on a large scale; but you do not consider it is a great evil?—No.

1638. (*Professor Allbutt*.) Taking this man now whom we have had before us, how far do you consider that this is a blight on his future career as a coal getter?—That man is about thirty or thirty-three. He has already been working from the age of thirteen or fourteen without much disablement. He has already been working for eighteen years without much disablement, and it is only now that he is affected. I am not sure that a man like this will not pass into a chronic condition of nystagmus where the symptoms do not appear to trouble him to any great degree.

1639. It might spoil one year in the next ten?—He may be off three months, and go back to work again.

1640. He might work nine out of the next ten years?—Yes.

1641. The compensation would be either temporary or permanent. Temporary compensation for a man like this would be three months. Then, if the question of permanent compensation came up, the point arises whether he should ever return to that work again?—That I do not see how one can say.

1642. (*Dr. Legge*.) What happens in Germany where they have a sickness insurance scheme? Is it met there by contribution on the part of the employers and employed lasting for thirteen weeks?—I do not know.

1643. Is there opposition to the view that you have expressed amongst the miners themselves as to the causation?—Nothing like there was. Twenty years ago they attributed it to the safety lamps. Very few men will say that now, and the reason I can attribute it to on the part of the men was this—they saw the safety lamp whirling round and they therefore thought it was that light which caused their complaint.

1644. Leaving nystagmus, do you know what is called "beat knee"?—No.

1645. "Beat hand"?—No.

1646. Whether it is a strain affecting the knee from one position?—I quite believe—

1647. But it has not been brought to your notice?—No.

1648. During your prolonged enquiry into miners' nystagmus?—No.

1649. You have seen some cases of blindness following poisoning by di-nitro-benzol?—Some years ago I went thoroughly into the matter.

1650. We have not had any evidence as to amblyopia following from it, and you have published some cases. Would you let us have the information shortly?—Before I finish miners' nystagmus I should like to say I have made a series of observations as to the effect miners' nystagmus bears to explosions.

1651. How many cases are there of amblyopia following di-nitro-benzol poisoning?—That is some years ago. There was in the neighbourhood of Sheffield—there is a di-nitro-benzol factory now at Denaby. I have not seen any cases for years.

1652. (*Professor Allbutt*.) Because those works are closed?—They are better conducted. Before I published my investigations some years ago, several cases of amblyopia or failure of vision in workers in di-nitro-benzol came under my observation. This led me to make inquiries as to the manner of the work performed, and the effect of this di-nitro-benzol not only on the vision of patients, but on the system generally. My observations were published in a paper which appeared in the "British Medical Journal," March 3rd, 1894. At the time I was interested in the subject, Dr. Dupré, of the Home Office, and Captain Hamilton Smith, Inspector of Factories at Sheffield, had instructions to inquire into this matter, and as a result of my investigations, as reported to them, the Secretary of State decided that, in his opinion, the manufacture of explosives for which di-nitro-benzol was used was dangerous to health, and notice to observe special rules was given to the different manufacturers. The rules recommended were those drawn up by me for Captain Smith and Dr. Dupré and alluded to in their report. Since then I have talked to the manager of the place referred to once or twice, and the whole thing is now very different, I understand.

1653. (*Dr. Legge*.) I believe there was amblyopia in addition to the lividity and the other recognised symptoms. What form did that assume?—It assumed very much the form of toxic amblyopia.

1654. It was not optic neuritis?—No, it was a contraction of the field of vision, the vision of each eye was greatly impaired, greatly reduced, and the deterioration of vision was gradual.

1655. Lasting how long, or taking how long?—To come on?

1656. To produce itself?—This is the description of one case. I saw him on February 11th, 1892, "J. H., aged 35, presented himself on February 11th, 1892. He stated that just before the previous Christmas his sight commenced to fail. On reaching home at night he could not recognise his wife across the table. During the next few days it became much worse, and then deterioration was more gradual. Recently his vision has remained about stationary, and this, as will be explained, has been associated with an alteration of work. Vision in each eye is three-sixtieths, and he reads J16. Both optic discs are decidedly pale; the edges are quite defined, and there is no appreciable diminution in calibre of vessels. The field of vision is somewhat contracted concentrically, and there is a small fairly defined central scotoma for red and green. The pupils are normal in all ways. The patient has been a smoker for twenty years, consuming generally about 1½ oz a week; he has not been smoking more nor less than usual lately; the kind of tobacco he smokes is cut cavendish. He takes very little alcohol being almost a teetotaler. His face is pallid, lips bluish, and conjunctivae yellowish. The finger tips are blue, looking like 'cold fingers'; the nails are discoloured, of a fawn colour, darker at the ends, and gradually tapering towards the matrix. The toes are like the fingers, the nails being even more discoloured. The urine was free from albumen; specific gravity, 1029; whilst he was engaged in the work to be mentioned, it was dark like ink, but it has lately become clearer. The man's occupation properly is that of a blacksmith, but being out of employment and failing to get anything to do at his own trade, he went to work in July, 1891, for a company where explosives, in which nitro-benzol was used, were made. Previously to undertaking this work, he asserts that his health was perfectly good and sight excellent. He was employed at these works in the 'mixing shed,' and worked there in the way that has been described. He began this three days after joining the works. On the first day he asserts that he felt the effects of the benzol. He experienced giddiness and shortness of breath. A short time later he looked yellowish and his lips blue. The giddiness compelled him to sit down. Gradually he appears to have become accustomed to these symptoms, and he does not seem to have suffered as severely as others. He

kept out of the mixing shed as much as he could, and his residence being a good distance from his work, he was compelled to take a good sharp walk. These are reasons, he thinks, why he suffered less than others. Before Christmas, however, he became worse; the shortness of breath increased; he tossed about in bed in his sleep, and suffered from great weakness. He experienced a want of sensation in his arms and legs, and they were 'prickly feeling;' the legs were numbed to the knees and the arms to the elbows; there was a stiffness about the hands and feet, but especially the fingers; he finds a little difficulty in undoing his collar button. The patellar reflex is good (exaggerated?) When 'mixing,' he suffered from occipital headache a good deal, but he has not had any vomiting. Memory, taste, and smell are all good. He was disturbed and restless in sleep, and was troubled with dreams and shouted out. A marked effect had been wrought on his sexual functions. He had lost desire. He had not been amongst the powder for a month. The only other point to mention is that he suffered from an attack of influenza before going to the explosives works. He was desired to avoid all contact from the benzol compounds, and the firm provided an occupation away from these for him. He was prescribed liq. strych. in a mixture. He was desired to continue his smoking precisely as he had been accustomed to. Progress towards recovery was steady."

1657. Was there complete recovery in this case?—I think so. A great point is the enlargement of the veins.

1658. These cases were from the factory, not from simply using roborite cartridges in the mines?—No. They were all engaged in making explosives.

1659. (*Professor Allbutt.*) I should like to ask you

whether the contraction of the field of vision can be taken as a test with other things of di-nitro-benzol poisoning. Is it sufficiently constant?—There was a central scotoma, I have the exact wording here by way of summarising the symptoms in the cases which I recorded. Referring to the cases mentioned, the characteristics are: failure of sight, often to a considerable degree, in a more or less equal extent on the two sides; concentric contraction of visual field, with, in many cases, a central scotoma for colour; enlargement of retinal vessels, especially the veins; some blurring, never extensive, of edges of disc and a varying degree of pallor of its surface—the condition of retinal vessels spoken of being observed in workers with the di-nitro-benzol independently of complaints of defective sight. Cessation of work with the benzol leads to recovery. In one case, vision had continued defective, with contracted field, a considerable time after the exposure to di-nitro-benzol had ceased. The symptoms mentioned are quite in accord with toxic amblyopia from other causes, whether it be tobacco, iodoform, or bisulphide of carbon, of which several cases are on record.

1660. Supposing a person complained of poisoning in these works in good faith?—Yes

1661. And this contraction of the field of vision could be taken as an objective symptom by which his statement could be tested?—Yes all these people suffer from the general symptoms.

1662. That can be taken as test?—Yes.

1663. And the veins are of really excessive diameter outside mere individual peculiarity?—Yes, deeper in colour and larger in diameter.

Mr. ARTHUR HALL, M.D., F.R.C.P., called and examined.

1664. (*Chairman.*) Dr. Arthur Hall, M.A., M.D., F.R.C.P., I believe?—Yes.

1665. Physician to the Sheffield Royal Hospital, Visiting Physician to the Sheffield Union Hospital, and Lecturer on Morbid Anatomy at the University of Sheffield?—Yes.

1666. As Physician to the Sheffield Royal Hospital for 17 years, you have had an extensive experience of certain trade diseases of Sheffield due to dust inhalation?—Yes, sir. I have.

1667. These take the form of respiratory affections, do they not?—They do.

1668. I will ask you only for a more popular description of the disease, leaving the technical one to Professor Allbutt. But speaking in popular language you would say that they are characterised by a gradual and insidious onset of the nature of chronic bronchial catarrh, which in the early stages is most evident in the winter months as a winter cough?—Yes.

1669. As the disease advances, shortness of breath, persistent cough, weakness, and inability to work follows?—Yes.

1670. In the early stages, can you diagnose this disease easily?—Not easily.

1671. In the later stages is it easy or difficult?—Sometimes easy, sometimes difficult.

1672. When it has once started the progress is usually steady?—Usually progressive, from bad to worse.

1673. To what sorts of dust do you attribute the disease chiefly?—To dust either from stone in grinders, or to dust from the pearl or the horn in the cutlers, the dust in the ordinary cutler's work in the making of the knife.

1674-5. The handles of the knives?—Yes.

1676. (*Chairman.*) Dust chiefly from the grinding machines?—And also from the object ground.

1677. Then steel dust enters into it?—Steel dust apparently enters into it.

1678. To a larger extent or less?—To a less extent than the others.

1679. Steel less than the others?—That is my impression.

1680. Are those the only three sorts of dust which originate the disease to which you are going to call our attention, or are there any other sorts of dust?—I do not think compared with these that there are any others in my experience of equal importance.

1681. We have got three dusts, dusts from grinding wheels, steel dust, and there are dusts of handle materials?—Horn or pearl or ivory.

1682. Of these you consider that the dust from the wheels, from the abrading substances on the wheels is the most important?—Yes.

1683. Of what does the dust from the abrading wheels or the grinding wheels generally consist?—It is the ordinary grit of the stone.

1684. Silica. Is there dust from wheels, corundum powder?—Yes.

1685. That will be another one and different from the dust from the—?—Quite so, it has nothing to do with the grinders.

1686. There will be emery dust, will there?—That is certainly possible. I have no actual evidence.

1687. Now, I suppose, Dr. Hall, that you have the opinion that it is not all dusts that are equally dangerous. Some dusts in the inflammation of the lungs are much more dangerous than others?—I think so; yes.

1688. And silica dusts, hard silica dusts, would be among the more dangerous group?—Yes.

1689. Emery dusts you are not prepared apparently to speak very positively about?—No, I am not.

1690. Steel dust, a less degree than the hard stone dust?—Yes.

1691. I will first take horn; I should like to put it you that I have seen a horn factory?—Yes.

1692. Where the men were inhaling the most enormous quantity of horn dust and they said it did them good, would that surprise you?—Yes.

1693. They have treated it in some places as absolutely innocuous. Horn dust in some places is considered very innocuous. Have you, for instance—can you give us any facts upon which you base your opinion?—As to horn I am surprised?

1694. Or was it the material that was grinding the horn that had come off?—I have no positive evidence that horn by itself is an irritating dust. But these men work in various dusts, and one is unable to say always from the lung or from the symptoms exactly which dust is the more important as an irritant, and one has to, more or less, class them all together, because sometimes they are working in one kind and sometimes in another.

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Mr. A. Hall, 1695. In naming the different sorts of dust, you do not desire to lay stress upon the badness of this or that particular dust, so much as the effects that are produced among the men who have been working at the trades of knife making or steel grinding respectively?—That is so.

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1696. Is this disease that is got from dust so specific that you can distinguish it from ordinary phthisis, tubercular phthisis?—I think you would distinguish it rather by negative characteristics than positive ones.

1697. Explain that.—The symptoms may be very similar to those of tubercular phthisis, but there may be an absence of tubercular bacilli in the sputum examined.

1698. If you had a man suffering from phthisis and did not know what his trade was, could you by a prolonged examination tell whether he was suffering from fibroid phthisis or not?—If he had bacilli in his sputum it would be positive evidence that he had tuberculosis, but I do not think you could say whether that was grafted on an original fibroid disease.

1699. Supposing he had no tuberculosis about him?—It would be very suspicious, but I do not know that you could positively say so.

1700. The most severe form is with regard to dry grinders rather than wet grinders?—Yes.

1701. You would hesitate to say that there was a typical cutler's lung?—Yes, I would.

1702. But do you think that a larger number of cutlers suffer from respiratory diseases than the average of mankind?—Yes I do.

1703. Is there a difference between men and women in that respect?—Yes. In the Sheffield statistics. You do not mean as cutlers?

1704. That was what I was coming to. Taking the general population of Sheffield or England is there any difference between the amount of tubercular disease in women as compared with men in percentage?—Yes.

1705. Which sex suffers more from the disease?—The men I should say.

1706. There is a natural tendency in man to catch it more than women?—Tuberculosis, I think so.

1707. You are not able at this moment to give the exact figures?—No, but that is my impression.

1708. And when you come to Sheffield the difference would be still more marked. Can you give us any idea of the proportion of cutlers that suffer from diseases of the respiratory organs in Sheffield? Have you any statistics?—No actual numbers of the proportion of cutlers. I have some statistics of the number of cases attended that I have come across in respect of trades. I do not know what proportion that bears to the total number employed.

1709. Should you say that the life of the cutler, the grinding cutler, is shorter than that of the average workman?—The grinder is not classed amongst the cutlers. He is a separate man.

1710. Is there a typical grinders' lung?—Yes

1711. You told us that there was no typical cutler's lung. Is there a typical grinder's lung?—Yes, Sir.

1712. And among the grinders there is more respiratory disease than amongst others of the population?—Yes, there is, Sir.

1713.—Can you give us any figures with regard to grinders as to the proportion of men that would be suffering from the disease to the total number of grinders?—I could not.

1714. No more than in the case of cutlers?—I could not.

1715. Is it your impression that the grinders live a shorter life than the average workman?—It is.

1716. Can you give us any figures, supposing you were advising an insurance society for instance, as to the premium that a grinder ought to pay as compared with a carpenter or a man engaged in some other trade, what would you say?—They would be very vague, but from my own cases that I have seen I think that the average comes out to the grinder usually being finished at 40 to 45 years of age.

1717. Finished off?—At any rate when he is in the last stage of pulmonary disease.

1718. Do you mean that the average grinder—dry grinder—the average grinder, as things are now, would not be expected to live above 45 years of age?—No.

1719. That is his expectation of life?—Not if you take the whole of the grinders. The only evidence I have is of the ages of those who have come up to hospital suffering from severe symptoms.

1720. That of course is a different thing?—I have no information on that, the average life of a grinder.

1721. But the average life of the grinder. You have examined the sick grinder above 45?—No; I have no actual figures on the point.

1722. You cannot give us any figures tending to show what proportion these grinders suffering from the disease bear to the grinders in general?—I cannot, Sir.

1723. Nor can you give us apparently any help in determining what the risk to life should be considered of the grinder's occupation?—I think it would be very difficult, and of course there are wet grinders and dry grinders. It would be different in the case of the dry grinders.

1724. The dry grinders—do you consider it an occupation that shortens life on the average?—I do.

1725. Can you give us the number of years on the average, the whole of them, well and sick altogether—of course I cannot press you?—I should say that they do not live much above 50, the dry grinders.

1726. I am speaking of dry grinders?—I think, Sir, that I really could not give a definite answer.

1727. (*Professor Allbutt.*) In your hospital—what impression have you with regard to other diseases amongst grinders? Leaving out phthisis, do they come in suffering from other diseases?—Not to any extent.

1728. In those who come in suffering from other diseases, do you find a prevalence of lung disease notable?—In Sheffield?

1729. Grinders will come in for other things, but are you led at the same time to discover that they have very commonly pulmonary complications? A. B. comes in to you. He is a dry grinder, and he has another disease, kidney disease, do you anticipate that he will also have pulmonary complications?—It is common to find that where a man has been working as a grinder and comes in for another disease, there is some affection of the lung.

1730. Practically you do not come in contact with the grinders unless they are ill from some cause or the other?—No.

1731. (*Chairman.*) Sheffield as a town is subject to phthisis more than the United Kingdom?—Yes, according to the statistics.

1732. And I understand that the climate here is not a very good one for lung diseases, having some tendency to bring them on. You see my object? We want to discriminate as it were?—I should not have said that Sheffield was a bad locality for phthisis *per se*.

1733. That is what I wanted. It is not considered that Sheffield is peculiarly subject to consumption. It might be replied that there is a good deal of consumption about. I wanted your opinion on that point. I suppose phthisis is, to a certain extent, aggravated by alcoholism?—Yes.

1734. If a man who has got phthisis in a slight and early stage were taken off the grinding for a time, then I suppose he would recover—the state of the lung would recover?—I think it would be very difficult to answer that. I think we are rather confusing terms. When you speak of phthisis I do not know whether you mean tuberculosis or grinders dry fibrosis.

1735. (*Professor Allbutt.*) We may take phthisis as a chronic destructive lung disease of whatever origin—phthisis does not connote tubercle. If the man having started with this chronic lung disease were to stop his work would he recover so as to be able to go back to his work again?—I question very much whether he would be able to do that. He might recover and do some other work, but there is the lesion produced.

1736. When he is re-exposed you think it will come on—whatever the interval.

1737. (*Chairman.*) An interval would be of no use?—No.

1738. Would it be of use in preventing his getting it by having intervals of grinding and no grinding?—I do not think so.

1739. We have had evidence given us that in the ganister trade in which you inhale dust of that character that alternations of employment would bring a man

considerably right again, and in fact prevent him from getting phthisis—you have no opinion on that?—I have no experience of that, and I could not express an opinion on it. As a matter of fact many grinders have considerable intervals. The wet grinder has intervals between the times when he races his stone. That is a matter of only a few minutes in several days.

1740. Have you any suggestions to offer as to the way in which this fibroid phthisis could be diminished?—As to how to prevent them inhaling the dust?

1741. Is there anything to be done?—I do not know of anything you can do.

1742. Are you acquainted with any of the factories and the way dust is created or breathed?—To a certain extent, yes.

1743. Changes have taken place in the last few years for the better, to what are those changes due—what precautions would you like to see taken?—I am afraid I do not know sufficient about the working in the factories for my opinion to be of any value on this point.

1744. Some mode of reducing the dust is the great thing. Are there not, as a fact, a number of trades carried on in closed rooms where dangerous dust prevails that might very well be done by men warmly clad, more like seamen, in very much more exposed situations where their health would be better?—Oh, I think certainly.

1745. Would you have any objection to see men work in a mere shed to keep the rain off and allow the winds of Heaven to blow in and themselves clad in warm garments?—I think it would be most advantageous. Of course there is the point, it depends upon what extent the man has to work with his fingers, as to cold and so on, how much he has to use his fingers.

1746. Consider what a sailor does in tying knots at sea, even in cold weather. When he is a little habituated to it would not the man in this case be able to work under some such conditions?—I do not see any reason why he should not.

1747. Is not it your impression that a good many of these trades are carried on under conditions of enclosure from the weather which are not advisable in the interests of the health of the men?—Yes.

1748. Some exposure and warm clothing would put an end to lung troubles?—I do not know that I could say that it would put an end to lung troubles, but it might check the tuberculosis.

1749. That is what I meant by it. Will not it check the fibroid disease too if you blow the dust right away?—But the dust might blow into the air passages just as much whether there are side walls or not.

1750. There is one thing in an enclosed factory, the dust that goes about lies upon the beams, the tops of doors and other places and at the slightest motion is blown down?—Yes.

1751. Whereas if you had a very open shed the dust would be dispersed by the winds?—I see that point of view. I think it would differ in different cases. In the case of the grinder he practically works in the open air. His windows are not closed.

1752. It is very largely open, and you prefer in cases of that sort windows open or with no glass in them?—Yes.

1753. (*Professor Allbutt.*) I understand that you are speaking as a hospital physician?—Yes.

1754. Have you any notes that you would like to volunteer, anything that you would like to offer the Committee?—Yes, a list of all the patients who have been admitted during the last three years into the consumption block at the Fir Vale Union Hospital, with particulars of their trades, and I have made a small statement of that as to their different trades, during the three years, with the percentages. I have divided them into cutlers, file cutters, grinders, horn and ivory handle makers, fluters they are sometimes called, and silver smiths, and I find that of 500 cases admitted into the phthisis block, into the tuberculosis block at Fir Vale Hospital—

1755. Under what tests, positive tuberculosis?—Not absolutely all of them. But you may take it that the bulk of them are.

1756. *Prima facie* they were?—Of those 6·4 per cent. were grinders; cutlers 3·6; and each of the other trades mentioned above comes to less than 1 per cent.

1757. That is both sexes?—No, males only.

1758. You are speaking of the male side of the hospital?—Yes. *Mr. A. Hall,*
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1759. That applies to persons of all callings?—Yes, the greatest percentage of them, 186 out of 500, style themselves labourers. 16 Nov. 1906.

1760. What proportion do the grinders bear to the population?—I could not say. In the Medical Officer of Health's report there is a statement as to the actual number of grinders in Sheffield.

1761. This proportionate quantity, is it higher than it ought to be considering the number of grinders in this population?—I should say it is a good deal higher than it should be.

1762. It is a good deal higher than it should be?—I have here a list of the numbers of cases of phthisis from various trades coming up to my out-patient department at the Royal Hospital per annum. This includes phthisis in a general sense. The average per annum for six years, 1891 to 1897, is 5·1 grinders, 3·3 cutlers, and of the other trades—file cutters, handle makers, and silversmiths, each about one.

1763. Would you again say that that is disproportionate of incidence?—It shows the grinders again to the front. Probably the above numbers multiplied by four would represent the number of each trade that come up to the larger institutions with this disease.

1764. These are out-patients; how many do you see in a year?—500 to 700.

1765. As regards secondary tuberculosis—where it is presumably secondary—is there in a large proportion of the grinders' phthisis a strong tendency towards tuberculosis?—Yes.

1766. More often than not?—Yes.

1767. Do they work under conditions to favour infection from man to man?—Grinders, no, I do not think so.

1768. Coughing, and spitting?—I think not.

1769. Is there more alcoholism among grinders than in the general population?—Not that I know of.

1770. They are quite a respectable lot?—I believe they are quite as good as the cutlers.

1771. Do you consider that wet grinding comes in at all?—Yes.

1772. Although it is less than the other, you do not exclude it?—No.

1773. Until we come to the disease itself, and you have said that on the whole, as Dr. Robertshaw said, the diagnosis is very largely by negative characters, but that, as he also told us, the negative points may become accumulatively positive?—Yes.

1774. Would you say that if your knowledge is complete—and we cannot be sure of anything without complete knowledge—if your knowledge is complete, if you had a person under observation for a sufficiently long time, and you get trustworthy evidence from him and his friends as to the cause of his malady—and I will now confine myself to the first stage only—should you say that it would be difficult to form a differential diagnosis? I am suggesting to you points like these—would you consider that the absence of marked wasting, anaemia, the comparative absence of fever, a high degree of shortness of breath, a certain amount of dependence on seasons, and a notable degree of illness beyond what physical signs seem to account for, would that in the first stage of grinders' phthisis, enable you to diagnose it from tuberculous phthisis?—I do not think I could accept that entirely as it stands for grinders' diseases. I should say that the early stages of the grinders' disease is comparatively slow—takes months or years. With the early stages there is no marked difficulty of breathing, a little winter cough, supposed to be a little bronchitis, represents all the trouble the man has for some time, then when it does begin to affect him, the physical signs—

1775. The second stage?—Second stage. In the second stage I should say that the symptoms he complains of are disproportionate to the physical signs to be found.

1776. (*Dr. Legge.*) Is that the time when he consults a medical man?—Yes.

1777. (*Professor Allbutt.*) Pushing my comprehensive question on a little later in the case to the second stage, it would hold good?—I think it would meet the condition of the grinder.

1778. In the first stage, in reference to what the

Mr. A. Hall, Chairman said, they are recoverable if they go to M.D., F.R.C.P. another occupation?—Yes, I think so, in the first stage

16 Nov. 1906. 1779. In the second stage is that true to a less degree?—In a much less degree. I should think they are beyond recall.

1780. Beyond recall. Then at a stage when the patient is curable, diagnosis is not made so easily as I suggested?—No, sir, it is largely by knowledge of the trade.

1781. I have given you complete knowledge of the trade. Supposing you have a general knowledge of the conditions under which the man worked, you get a fairly good history from the man, and you have him under a month's observation, temperature and so on?—I think you could form a fairly good opinion as to what was the trouble.

1782. Those are not difficult conditions in practice?—They are not difficult.

1783. Then there is the absence of tubercle?—And also the absence of signs in the chest.

1784. Is there any fever before they become complicated with tubercle?—I do not think so. One very seldom gets them under observation for long.

1785. You do not expect fever; this would be an important point?—Yes.

1786. We assume there are no tubercle bacilli in the sputum; is there any characteristic deposit in the sputum, silicious particles or iron particles?—I do not know—the sputum of chronic bronchial catarrh plus the black of Sheffield smoke.

1787. Carbonaceous matter. Concerning personal idiosyncrasy?—It enters into it to a certain extent. I certainly have records of cases in which fathers and brothers, the whole family, all went to the same trade, and one after another have died quite young from grinders disease.

1788. Can you tell us the contrary case?

1789. (Chairman.) It does not necessarily seem conclusive, because you may get a tuberculous family who would have died off in the bookbinding trade?—In saying that, I cannot exclude the reflection that they might have been a tuberculous family, and might have gone off in this manner in any trade.

1790. (Dr. Legge.) You said, in answer to Mr. Cunynghame, that you drew a distinction between grinders' lung and cutlers' lung?—Yes.

1791. Would you take that (*producing an illustration*) to be a typical example of the condition you would find in a grinders' lung, this nodular and fibrotic condition?—Yes.

1792. How will cutlers' lung differ from that, post-mortem?—My impression is that in the cutlers' lung more commonly the nodules are more diffuse.

1793.—You do, however, get the nodular condition in the cutler's lung?—Yes.

1794. And as regards the wet grinder's lung?—The wet grinder comes in with the dry grinder as a typical grinder's lung.

1795. Does the horn and the handle polishers' lung contain fibrous nodules too?—To a certain extent yes, but not like the extensive grinders' fibrosis.

1796. To the same degree that you would find it in the cutlers' lung?—I could not say.

1797. Firstly, you have the grinders' lung, then you have the cutlers' lung in which you say that you will find *post mortem* more diffused fibrous nodules?—That is my impression.

1798. Then have you a third condition in which there is a handle polisher's lung?—I could not distinguish that and say that is a handle maker's lung and is different from a cutler's lung.

1799. You put the cutlers' lung and the grinders' lung apart?—I put the grinders lung apart and I could not separate the others.

1800-1. (Professor Allbutt.) What is a cutler?—A cutler is a man who makes a knife, puts together a knife, a pen knife, pocket knife, etc. A grinder does nothing but grind. The cutler merely puts together what the grinder has done.

1802. He has no dust to contend with?—The medical officer will tell you. I think it is a little difficult to go further than that, than to say that the grinders' lung shows the same type as the stone mason's lung and the others are more vaguely fibrous.

1803. (Dr. Legge.) If the wet grinder is supposed to grind the steel wet, does he get affected?—He gets it by racing the stone, preparing the surface of the stone to use for grinding purposes, it is then that he gets the dust.

1804. If there is a huge development of dust in that process, it can be taken away by an exhaust fan when the operation is done?—I should think so.

(Chairman.) It is not done much at present.

1805. (Dr. Legge.) Following up that distinction between the grinders' lung and other conditions, now I come to the symptoms. You said that from the description of the symptoms given to you, and having the person under observation and knowing his employment and the absence of tubercle bacilli you could form a good opinion as to whether it was fibrosis or not. You could have a good opinion?—I said a fair opinion. I was not very clear about it.

1806. (Chairman.) After death from fibrosis of the lungs, could you differentiate by *post mortem* examination the cutlers' lung, the horn polishers' lung, the grinders' lung?—Well, I think possibly at that stage, but I do not care to give an opinion.

1807. You think however that from those early symptoms you might be able to say even in the case of the handle polisher?—I am not very clear about the handle people.

1808. The people who are doing the horn, pearl and bone?—That includes the cutlers. Cutlers who are working in these dusts as well.

1809. Knowing how the Workmen's Compensation Bill, so far as diseases are concerned, is to be worked, by the certifying surgeon examining a man and stating whether his condition is due to his employment, and in case of dispute an appeal to a medical referee who would have special skill and whose word would be final, do you think there is difficulty, serious difficulty, in the matter of diagnosis if fibrosis of the lungs in grinding and cutlery were scheduled?—In the early stages I do.

1810. When he comes to see a medical man, the commencement of the second stage?—No, I do not think there would be. One gets to recognise these cases readily. When they walk into the out-patients' department they are a type which is quite characteristic once they have got to the stage of having to begin to knock under at all. In the earlier stages one does not often see them. They do not come under treatment, and they would be very difficult to be sure of.

1811. You have not heard of any employer in the town asking a medical man to examine all his workmen to see how far they are affected?—No.

1812. In *post mortem* examination you have said that this grinder's lung can be always recognised?—Yes.

1813. And I take it that in the case of cutler's lung you cannot have the same certainty?—No.

1814. (Professor Allbutt.) Although there may be a differential diagnosis between non-tuberculous and tuberculous phthisis, you are not prepared to say that there would be any differential diagnosis between the varieties of the non-tuberculous phthisis?—No, I do not think that would be possible.

1815. At what stage do you think sputum could be got?—Sputum is quite an early feature, and I should say a very constant one. Even when a man has very little symptoms he will spit in the early morning.

1816. Sputum could be taken at a very early stage?—Yes.

1817. That would be very important; I am glad you can give us a strong lead about that. Then there is one point I omitted to ask you as concerning ordinary emphysema and bronchitis. Dr. Robertshaw told us that it was not more prevalent here than in most places?—Not more prevalent. Sometimes there is a compensatory emphysema in those cases of fibrosis, which often leads to the appearance of emphysema when often the disease is really fibrosis.

1818. He said he thought it was a difficulty rather on paper than in practice?—It is a difficulty in finding out the physical signs.

1819. As to trade eczemas of one or two kinds?—In certain branches of the silver plating trades a certain small number of cases of eczema of the hands occurs, for instance, in the polishing of articles with scratch brushes, using water or sour beer or other liquids of that character. They get an eczema of the hands, often not sufficient to prevent them working,

But in some cases disabling them for considerable periods from their work. I am not able to say that this precisely comes from the use of scratch brushing. I attribute it rather to the working in the wet. It might be prevented by the use of gloves.

1820. (*Chairman.*) Might it not also be that laundresses and maids cleaning doorsteps also get the same thing?—Yes, servants and charwomen.

1821. And there is nothing specially characteristic between the different eezemas caught by the people who are scratch brushing and that of the people who are doing laundry work?—No.

Mr. HAROLD SCURFIELD, M.D., C.M. called and examined.

1826. (*Chairman.*) You are Medical Officer of Health for Sheffield?—I am.

1827. M.D., of Edinburgh, and C.M.?—Yes.

1828. How long have you been Medical Officer of Health?—Three years.

1829. As Medical Officer of Health of this city it is, of course, your duty to pay particular attention to the health of the city?—Yes.

1830. And amongst other questions to that of industrial phthisis?—Yes.

1831. You hand in three reports, three annual reports of the health of the city of Sheffield for the years 1903, 1904, and 1905, the first of these, by Doctor John Robertson, late Medical Officer of Health, and the last two by yourself?—Yes.

1832. There are certain portions of these reports to which you desire to call our attention?—Yes. In the 1903 Report, from page 48 to the last paragraph but two on page 50; the 1904 Report, page 8, paragraph 7, down to page 14, and also pages 18 and 19, and page 47; and the 1905 Report, bottom of page 8 to the middle of page 12, and the tables on page 45.

1833. Now, I had better first ask from a general point of view the character of this disease. Are you of opinion that there is a difference between what may be called fibroid phthisis and tubercular phthisis, which, though somewhat difficult to distinguish in the first stages, is at later stages distinguishable by a medical man sufficiently acquainted with the history of the case?—I should not have thought so. But I do not think my opinion on the subject is of much value.

1834. You think there would be a difficulty?—I should have thought there was great difficulty in distinguishing.

1835. A great difficulty in distinguishing?—Yes. But I do not want to press that. I am not a hospital physician.

1836. I want your opinion. You are an M.D. You would be inclined to think there is some difficulty even at later stages?—I think it would be difficult. My point is this: If you have a man working at an occupation which is known to produce a damaging effect on the lung, such as is the case with a grinder, you cannot exclude the fact that a certain number of such persons would have developed consumption whether they had been grinders or not, and, therefore, you cannot say in all cases whether it was the grinders' disease or the tubercular mischief which came first. What I mean is, you may get a man in the first stage of tubercular phthisis working as a grinder. It would be hardly fair to class the whole of his symptoms as if they were due to grinders' phthisis. On the other hand, it is also fair to say that fibroid phthisis may pave the way for tubercular phthisis. I believe it is the case that nearly all cases of fibroid phthisis, if they live long enough, become tubercular.

1837. The reflection cuts both ways?—Yes.

1838. But still we have had in other cases elsewhere the opinion that if a case is sufficiently known, and the circumstances attending it are sufficiently known, you can distinguish at later stages?—I should think you would get merely a probability. My point is this—it is not like an accident. You can say that a certain injury is caused by an accident.

1839. It is not like a beam falling on a man's head?—I agree.

1840. After death, when you could examine the lung, they say you would be able to tell for certain by seeing the particles in the lung in the case of fibroid phthisis?—You would be able to know that there were

1822. It is all one disease?—I believe so.

1823. (*Dr. Legge.*) Is there any idiosyncrasy so that some have to give up the employment altogether?—Yes, undoubtedly. 16 Nov. 1906.

1824. (*Professor Allbutt.*) Would the use of an oleaginous wash prevent it?—It might help, but I do not think it is sufficient alone.

1825. (*Chairman.*) It is not brought on by any other diseases, such as syphilitic diseases or any other kind?—Oh, no, not at all.

particles in the lung got from the man's occupation, but if there were also tubercular cavities you would not be able to say with certainty which began the trouble. Any man who works in stone dust will have some particles in his lungs.

1841. You would not put too much weight alone on *post-mortem* examinations, because it would be quite possible there might be particles in the lung, and yet that tubercular consumption had really done most of the evil?—Yes.

1842. Too much weight, therefore, must not be laid on that conclusion alone—I was perhaps too much impressed with the argument?—On the other hand, you might get a lung with a considerable amount of stone fibrosis, that is fibroid phthisis, which, after having become tubercular, is riddled considerably with tubercular cavities. The tubercular mischief in such a case coming on the top of the other might make one think that more mischief was due to the tuberculosis than really was the case. The lung might have been spoiled as a lung by grinders' phthisis, but on the top of that you may have cavities that have removed the grinders' disease to some extent.

1843. At all events, the conclusion you draw is that there must always be some difficulty in an attempt, where a man has died of phthisis, definitely to put it down to the occupation or to other causes?—I think so.

1844. That is your considered opinion?—That is my opinion. I have rather in view the conflict of evidence among medical men in cases of accident at present, and I shudder to think what it would be if there was an inquiry to determine the exact cause of death in phthisis.

1845. But in the event of this disease being put in the Third Schedule to the Workmen's Compensation Bill, it would be inevitable apparently to have some conflict of that sort?—Yes.

1846. You say that that difficulty presents itself to your mind?—I don't see how a fair conclusion can be arrived at.

1847. I will not go into the symptoms of this disease, you have come chiefly to deal with the mortality statistics of the matter. In your own way can you now give us some statistical information. Are you able from the data in your possession to give us some general idea of the extent of phthisis in Sheffield, and particularly amongst the grinders?—Yes, I think so.

1848. The town of Sheffield is, in your opinion, not particularly affected with the scourge of consumption above other towns in the Kingdom?—I would go further than that. I think that naturally the tendency to phthisis in Sheffield—the tendency of the population to have phthisis—is less than in other places. I base that on the fact that the mortality from phthisis amongst women is less than it is in the rest of England, and that the mortality among males in Sheffield is less than it is in the rest of England up to the age of 35.

1849. But taking all ages into account, it is higher, is it, than the rest of England?—From the age of 35 on to the end of life, the mortality in Sheffield among males is very much higher than it is in the rest of England. For example, if you take the age period from 45 to 65, page 9, 1904 Report, Table B, from 45 to 65 the death rate in Sheffield among males is twice as much as it is in England and Wales. Page 10 gives the thing fairly shortly. At the top of page 10 it is stated "In England and Wales a man is half as likely again to die from phthisis as a woman, but in Sheffield a man is more than twice as likely to die from phthisis as a woman. For every fifteen men who die in England and Wales from phthisis 18 men die in Sheffield, but for every ten women who

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die from phthisis in England and Wales only eight women die in Sheffield."

1850. The point of your observation is that there is a very marked difference in Sheffield between the men and the women, more marked than there is for the average of England, and also that there is a marked increase in the deaths from phthisis in Sheffield when once the age of 35 for males is reached?—Yes.

1851. Those are the two points, and there is also an increase among females?—In the case of females, when you get up to a higher age, when you get up to the age of 55 and onwards, there is an increase in Sheffield females as compared with England.

1852. What is the reason for that, they don't work in this grinding?—I do not attribute it to the grinding only, I attribute it partly to working in dusty workshops. Cutlers' shops are full of dust. Up to the age of 35 or so the male in Sheffield is not specially liable, but the man's occupation is the thing that causes consumption. If he gets consumption, then the factor of infection may come in at a later stage as regards his womenkind.

1853. He may infect the woman?—He may infect his wife. I would expect the woman to be infected at a later period than the man. I think it is possible that the increase amongst women in Sheffield over fifty-five may be partly due to occupation and partly due to infection from the men who have developed it at about forty.

1854. At all events, there is a large proportion of deaths from phthisis in Sheffield amongst men over 35; and part of these you attribute to occupation?—Yes, my conclusion is that during the last few years there have been on the average 118 men killed every year by the industrial conditions of Sheffield alone. You must remember that there are only 500 deaths from consumption in the year at all ages.

1855. And out of these you would put 118 as due to industrial conditions?—As due to the difference between the industrial conditions of Sheffield and England and over and above those that would die if the industrial conditions were the same as in England. It is the excess due to the special industrial conditions of Sheffield. What that is founded on is shown on page 10, paragraph 7: "In Sheffield the annual average number of deaths from consumption amongst females over 25 years of age during the years 1898 to 1903 was 115, and amongst males over 25 years of age was 310. In England the corresponding figures were 12,386 for females and 18,450 for males. If the proportion of female to male deaths had been the same as in England there would have been only 192 male deaths to correspond to the 115 female deaths. The number recorded was, however, 310. It is, therefore, fair to assume that the special industrial conditions of Sheffield are so unfavourable as to cause 118 male deaths from consumption every year over and above the number of male deaths that would occur under the ordinary industrial conditions prevailing in England." In using the word "industrial," I am using it in the very widest sense as embracing all sorts of occupations, not in the narrow sense of industries coming under the Factory Acts.

1856-7. What are those special occupations which you consider deserving of attention as accounting for this mortality?—Grinders, cutlers, file cutters, and also, I think, to a lesser degree, haft and scale cutters.

1858. Take the grinders first of all; can you give us some idea of the peculiar dangers to which the grinding trade is exposed, distinguishing wet and dry?—The figures on page 10 of the 1905 Report, Table A, show that the death rate amongst grinders from phthisis is more than five times that of the ordinary male in Sheffield.

1859. What are the respective numbers?—3,375 grinders.

1860. How many of these died from phthisis?—Forty-eight died from phthisis in 1904.

1861. What was the death rate from phthisis among grinders over 20 years of age?—It was 14·2.

1862. What was the death rate from phthisis amongst males generally in Sheffield?—Amongst males over 20 years of age in Sheffield the similar death rate is 2·7, so that the rate amongst grinders is nearly five times larger than it ought to be.

1863. What are figures for respiratory diseases?—The death rate from respiratory diseases amongst grinders is nearly three times as large as that of the average male over 20 years of age in Sheffield, as shown by the same

table. The death rate amongst grinders from respiratory diseases is 5·9, as compared with 2 in Sheffield generally and 1·7 in England.

1864. Are you able to account for these differences in figures in any other way than by the dust the grinders inhale?—I can only account for it by that.

1865. Not from any other cause, draughts, or anything that the grinders are subjected to; it is the dust you chiefly attribute it to. Is there no other trade danger?—I put my opinion in the second paragraph after the table. In this second paragraph after the table, I suggest as an explanation—but before I come to that let me read the paragraph which immediately follows the table, which puts in concise form what the table shows: "It will be noticed in the above table that the death rate of cutlers from phthisis is nearly three times that of the average male in Sheffield, and that the death rate from respiratory diseases among cutlers is more than five times that of the average male; also that in the case of grinders, the death rate from phthisis is more than five times, and the death rate from respiratory diseases is nearly three times that of the average male in Sheffield."

1866. To what cause do you attribute those differences?—That brings me to the second paragraph of the table on page 10 of this same Report of 1905, where I suggest as an explanation, "that while grinders are liable to inhale dust which injures the lungs and causes fibroid disease, which frequently becomes tubercular, the comparative freedom of grinders from respiratory diseases, as compared with cutlers, is due to the fact that the grinders work in a much less foul atmosphere. The 'hulls' in which grinders work are practically open-air sheds."

1867. In the case of the cutlers, is the disease of the respiratory organs due considerably to the confined places in which they work—is it due to dust or the foul air that they breathe?—Partly to dust, partly to foul air.

1868. So that part of the cutler's special disease would be due to causes which are common in other trades—cotton mills, for instance?—Common to such people as tailors who work in bad atmosphere.

1869. You would not in cutlers put it all down to dust?—I should put it down to both.

1870. For the reasons you have explained, in the case of cutlers it is not due to dust entirely?—Cutlers have a bad atmosphere as well as dust. Grinders have a much worse dust than cutlers, but they have not a bad atmosphere.

1871. In the case of cutlers you would not call it so distinctly a trade disease as the fibroid phthisis in the case of the grinders?—Exactly.

1872. What is the exact nature of the cutler's work?—I have put a definition of the word "cutler" at the end of page 9, which, I think, is fairly accurate. "The term 'cutler' applies to workmen who put together the various parts of table-knives, pen and pocket knives, etc., and give a final finish to these articles. The finishing is done by means of glazers, emery wheels, and wheels composed of linen; and the dust given off varies according to the composition of the article worked, e.g., in the finishing of a pearl-handled penknife the dust is composed of steel, brass, pearl, and emery." According to what is worked at, the dust varies very much. Everybody who works in the cutlers' shop is exposed to the dust, although there may not be many wheels at work. They do not shut off the grinding wheels from the rest of the shop.

1873. Have you any other remarks to make with regard to the mortality statistics?—The general death rates are given in that table. On page 10, 1905 Report. The death rate for a cutler over twenty is 43·2 per 1,000 from all causes, whereas the death rate for an ordinary male in Sheffield is only 15·8. The general death rate of cutlers is therefore two and a-half times that of the ordinary Sheffield male.

1874. Can you now give us any life statistics as opposed to mortality statistics, if I may put it in that way?—How do you mean exactly?

1875. Can you give us any statistics showing the relative length of life of the grinder as compared with the ordinary population, how much shorter it would be?—I have no statistics of that.

1876. There does not seem to be any possibility of obtaining them?—I could easily get out the ages of all the grinders at death.

1877. And at what average age a grinder died as com-

pared with the average age of a person in another occupation?—I do not think there would be any difficulty in getting the information from the trades union officials or the friendly societies.

1878. You would be prepared to find that the average life of a grinder would be shorter than that of an ordinary man?—Yes, because the death rate is two and a half times as large. That must mean a great shortening of life.

1879. You could not do it from mathematics, there are other considerations, you would have to do it from statistics?—Yes, there are many fallacies. A man may be a grinder, and he may go into the workhouse after he has been a hawker for two or three years. He may describe himself as a hawker, and at death he might be classed as a hawker. But I should think one would get easily from the friendly societies or the trades unions the age to which a grinder goes on working.

1880. At any rate, you have not now any figures tending to show that grinders do not live beyond a certain age if they carried on their profession up to it?—I have them in the office. It is only a question of going through the deaths of grinders. It would be possible probably to arrive at a computation of the age to which the average grinder lives if I were to go into the figures, and I should be very glad to do that and send the information on.

1881. Could you give us an idea of the proportion of grinders in any given place who may be presumed to be suffering from this disease—either incipient phthisis or diseases of the respiratory organs, any figures to show that. You might be able to help us with figures from that point of view?—I think that among the ordinary population, males, the proportion would be one consumptive to about 200 of the population, and that among grinders it would be probably five times as great—taking it simply by the death rate. According to the death rate I should expect of 200 Sheffield people that one would be suffering from consumption, whereas of 200 grinders I should expect to find five.

1882.—Well, now, have you had sufficient experience of the city to say whether there are at present working as grinders in these factories a number of men whom you would like to suspend from that employment if you could stop them?—I could not say. I think it is mostly fairly heavy work, and when a man gets to an advanced stage of the disease, and is getting to the stage when he is scattering the tubercle bacilli about, he will not be at work.

1883. Of those who are at work, are there a number who ought to be suspended from it on account of their being in such a condition; that if they go on longer they will speedily die?—I cannot say as to that. I fancy that the fact of their being unable to carry out the work will stop them.

1884. If this phthisis were scheduled under the Act, I suppose it would cause a cessation from work, or their being prevented from working in the cases of a considerable number of grinders?—I suppose it would, but whether that would be much good to them or not I do not know.

1885. Perhaps those in the trade can say better. You are not able to throw light on the question whether it would cause considerable suspension of work amongst those employed at present?—No.

1886. You could not say whether there would or would not be a number of men who would have to be suspended from employment if this disease was scheduled; what proportion of men it would be necessary to suspend?—I do not know what the regulation would be as to suspending.

1887. Is it your opinion that after a few years' work a large number of those employed would be found to be touched more or less with fibroid phthisis?—I think that would be the case; a very large proportion indeed. That is using the word "touched" in the widest sense.

1888. A number of those so touched would not be sufficiently injured to prevent them continuing their employment?—Quite so. I think it would be very difficult to define when fibroid phthisis actually begins.

1889. Would it be your opinion that, if the disease were scheduled, it might be necessary to attach condition to the schedule with the view of preventing wholesale cessation of work on the part of a large number of men?—Yes.

1890. You think that the scheduling of this disease would lead to wholesale dismissals?—An employer would

be not unlikely, if this disease were scheduled, to discharge the whole of his employees and get a new lot and have them medically examined. My point is this, that up to the present time the conditions of the occupation have been such that any man who has worked as a grinder will be extremely likely to have the first symptoms and signs of grinders' phthisis. Therefore, an employer acting only for his own interest would discharge his old grinders and only re-engage or keep on those who had been at work as grinders for a very short period.

1891. To prevent that the only plan apparently would be to schedule the disease as regards those who enter the trade for the first time after some fixed period, and to treat those already in it in some special and specified manner?—Yes.

1892. And under some very special conditions?—Yes.

1893. You see the conclusion, and in your opinion, Dr. Scurfield, it would be a doubtful benefit possibly for the men themselves to put the disease down at once in the schedule now, and without any qualification whatever; it would be a very doubtful benefit for the men if it were to apply to all men now in the trade as well as those who should join it?—I should think so.

1894. It might work considerable hardship amongst the men who are already in the trade?—It might if retrospective.

1895. Have you any other remarks. I suppose the trade is a great deal improved as far as health is concerned in your opinion, as far as your observation goes, speaking of the last fifteen or twenty years?—I have only had experience of three years.

1896. By hearsay you have been able to gather that there is some improvement?—I do not know that there is any improvement. Most of the cutlers' shops are old buildings, and as far as I know they are the same as they were twenty years ago. There is no ventilation for a cutler's shop. The ordinary ventilation is simply a casement window, and of course if one person out of twenty objects to the casement window being opened it is shut, so that there is no ventilation. I should say that it would be absolutely necessary for the purpose of getting any improvement to have some system of mechanical ventilation in the cutlers' shops—fans and warming of the air.

1897. Then as regards grinders, the most dangerous operation that they do is the rasing of the stones?—The wet grinders, yes.

1898. The dry grinders, do they rase the stones?—The dry grinders are exposed to the dry dust the whole time. The rasing of the stones is dry grinding done by a wet grinder. There are some men who do nothing but dry grinding, while the wet grinders only do dry grinding when they rase the stones.

1899. You have been in a fair number of factories?—Not very many.

1900. Do you think upon the whole that as much is done in the grinders' shops as might be done in the way of fans and ventilation?—I do not think so.

1901. You think more stringent rules are required, and more measures ought to be taken, in fact, to clear away the dust?—Yes.

1902. Have you any views as to the best method of clearing away the dust?—I have been into factories, and I have been greatly surprised at the want of attention apparently both on the part of men and employers as to the efficient use of the hood and fan. I have a paragraph with regard to this on page 12, 1905 Reports "Even as regards the dusty occupations which are known to be dangerous, there is a considerable amount of indifference shown by both employers and employed. In some cases no ingenuity is exercised to provide a hood and shaft of a shape and type well adapted for removing the dust from the grinding wheel; in others the fan is out of order, and no trouble is taken to put it right; in other cases, again, the workman does not trouble to use the hood which is provided." I think there is one thing that has struck me more particularly in many cases—it is the bad fit of the hood. In many cases it does not seem as if the wheel was as much covered in as it might be, but that is a thing for a practical man to say how far it can be covered in.

1903. Have you seen any attempt to use magnetic arrangements to take the steel away?—No.

1904. Is it the steel or the stone dust that does the most harm?—I should think the steel. Of course, they

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are both bad. I should think it would be difficult to distinguish where you have got a mixture. What I was saying about the ventilation was that I think the only means would be mechanical ventilation with warming of the air.

1905. As to phthisis in Sheffield, have you any further suggestions or remarks?—I do not think that I have anything to add to my reports, which contain my views. There are a lot of bad conditions in Sheffield which might lead to phthisis, such as back-to-back houses and other bad conditions; bad home conditions among the poorer classes of the population.

1906. But as you have pointed out to us, these conditions, bad as they are, do not seem to account for the statistics you have given us?—Those bad conditions would be more likely to affect women than men, and I have pointed out that phthisis is not common among women in Sheffield.

1907. Those bad conditions do not seem to produce a state of phthisis, a severe state of phthisis, apart from industry?—There is something in Sheffield to counterbalance them. What that something is I have suggested in one of these reports. It is page 10 of the 1904 Report, paragraph 3, which I had better read: "The low death rate from phthisis in Sheffield among men up to a certain age and among women at nearly all ages appears to indicate that Sheffield has natural advantages which work against the spread of this disease. No doubt the pure air from the moors, enabled by the many hills on which the town is built to circulate more freely round the houses than is the case with a town built on the flat, and a tolerably porous subsoil are favourable factors. It must also be remembered that Sheffield, more than is the case with other towns, includes within its boundaries the healthy residential districts. These considerations help to counterbalance the effect of bad housing conditions which exist in parts of the city, but on the other hand they undoubtedly aggravate the gravity of the fact that the death rate among men at the wage-earning period of life is so high. The low death rate among women and youths shows that we must look to industrial conditions rather than to home conditions for an explanation." I may add that the more I reflect upon it I can find no reason for

this abnormal amount of phthisis amongst the males of Sheffield other than the causes due to their occupations.

1908. Have you got any statistics to show the difference between deaths from phthisis in Sheffield amongst persons, such as shopkeepers, for instance, and miners?—On page 10 of the 1905 Report there are statistics as to the ordinary males over twenty years of age in Sheffield.

1909. Have you any statistics of other special occupations, such as shopkeepers?—In Table B, page 11, of 1905 Report, you will see I have got silversmiths; the mortality amongst the various branches of the silver trade.

1910. Can you show us the figures of phthisis in any definite occupation in Sheffield in order to compare it with the figures for phthisis in grinders?—Table B, page 11, of 1905 Report, as to silver-working. The summary at the bottom shows the death-rate for the years 1900-1904, and the average for the five years is 21·2 as to all causes, 5·0 for phthisis, and 2·8 for respiratory diseases; as compared with in the case of grinders respectively 33·8, 14·2, and 5·9 and as compared in the case of the cutlers with respectively 43·2, 8·0, and 11·2; and in the case of file cutters with respectively 34·1, 7·0 and 3·2.

1911. Would you say that the 1905 figures you have given us are average figures?—Of course, in that Table A on page 10 of 1905 Report, the 2,500 cutlers, 3,375 grinders, and 1,850 file cutters, are very small populations to deal with, but I have only just got those populations from the Trades Union secretaries during this year, and they will vary from year to year, and I shall have to get the figures again for the year 1906, so that it will only be at the end of two or three years that one will get reliable results.

1912. If somebody had to insure these men against illness, it would amount to a considerable sum as compared with wages?—Yes.

1913-29. In your opinion, the element of danger does enter into the wage question?—Officials of the friendly societies and trade unions know quite well that the occupation of a grinder, and more especially that of a dry grinder, is a dangerous occupation.

SEVENTH DAY.

Friday, 23rd November 1906.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Mr. H. T. BUTLIN, F.R.C.S., D.C.L., called in, and examined.

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1930. (*Chairman*.) You have been good enough to offer to give evidence to us on the subject of chimney-sweepers' cancer. Have you had a good deal of experience in that disease?—Yes. Of course, I have not seen many cases myself lately, because I have ceased to attend St. Bartholomew's Hospital. I am consulting surgeon now, and not in regular practice there.

1931. During a long period of years have you come across a number of cases?—Yes.

1932. Do you think the disease continues now with equal prevalence?—I have taken the precaution to get the latest statistics from Dr. Tatham, dated the 15th November, 1906. May I read his letter? "My dear Mr. Butlin, I am very glad to be able to send you the most recent—and, indeed, hitherto unpublished—statistics of cancer mortality among chimney sweeps in England and Wales. You are doubtless aware that

chimney sweeps have for many years past been more liable to cancer than have males of any other occupation. In the three years 1900-1-2, among chimney sweeps in actual employment as such, at ages 26-65, the comparative mortality figure from cancer was 136, as compared with 63 among males of the same age in all other occupations." I may say the general mortality of males from cancer is put down at 63: 10 years ago it was put down at 44.

1933. Sixty-three in how many would that be?—I suppose 63 per 1,000. These figures I should think are 44 per 1,000 of deaths from cancer in males generally, and it has now gone up to 63.

1934. And among chimney sweeps the mortality is what?—136. "In the three years 1890-1-2"—that is, 10 years previously—"the comparative mortality figure had been 180. Among chimney sweeps of the same

age, but including retired as well as actually employed males, the comparative mortality figure in 1900-1-2 was 152, against 68 among all occupied and retired males."

1935. (*Dr. Legge.*) But that is a comparative mortality figure, is it not?—That is a comparative mortality figure.

1936. (*Chairman.*) Is this form of cancer distinguishable from cancer that prevails amongst the general population?—The old chimney-sweeps' cancer, as it was called, was cancer of the scrotum. Would you care to see a picture of it, because I have two here, which will give some idea of it. These are typical cases of chimney-sweeps' cancer (*exhibiting same*).

1937. Do precisely similar symptoms appear in persons other than chimney sweeps?—Yes, the same form of cancer is not at all infrequent, but it is not at all frequent in the scrotum of other people.

1938-9. Do chimney sweeps contract this cancer in other parts of the body?—Yes, on the surface parts—for instance, on the face and on the lip, inside the mouth, on the tongue and palate, and other parts of the body, and they get it in the oesophagus and stomach, and in the bowels. Whether it is due to soot or not so far down I cannot say. I should say it is due as much to alcoholism as soot.

1940. If you had a man before you suffering from cancer, and you did not know his occupation, could you say with any certainty whether it was chimney-sweeps' cancer or not?—I might be able to by other marks upon him. For instance, if it was on the scrotum, and he had these black marks and warts and so on, one would instantly come to the conclusion, and almost invariably rightly, that he was a chimney sweep.

1941. And that the disease was due to his employment?—Yes.

1942. The disease, of course, is of gradual growth, is it not?—Yes.

1943. And it may become greater in intensity over a period of many months, I suppose?—Yes.

1944. Or even years?—Yes, a year or two.

1945. So that a man may have contracted the disease, and be suffering from it in its initial stages, and not be incapacitated for work for some time?—He might not be incapacitated for work for many months.

1946. What would be the longest period before he would be incapacitated?—I do not think I have any statistics which would be reliable as to that, for this reason, that they have warts upon the scrotum for perhaps 10, 15, or 20 years, and they themselves are so careless that they really could not tell when the warts began to be cancerous. It is not easy for anybody to tell. It may have been going on for four or five years; as a rule, it is a tolerably slow disease. May I point out another thing which, of course, does not appear in the Government statistics? There are no statistics to show how many sweeps suffer from chimney-sweeps' cancer and are cured of it by operation. It is amenable to operation, provided it is taken in the comparatively early stages. Operations are then very successful.

1947. Why does this occupation particularly give rise to cancer?—Probably owing to the effect which the constant application of soot to the surface produces. It produces irritation, and that irritation results in the formation of little warts. Then the soot gets rubbed into the warts. I do not believe, and I do not think it is believed by anybody, that there is anything cancerous in the soot itself, but the soot prepares the skin of the body for cancer. That is our theory.

1948. Do you think it can be prevented by greater cleanliness?—It is generally supposed that chimney-sweeps' cancer does not occur in any other country, and some years ago I took a great deal of trouble to find out. There were not, 10 years ago, any general statistics published in any other country like those published here. There were none published for France, Germany, Holland, or Belgium—in fact, for any European country. Therefore I was obliged to take special measures in order to find out. I looked at literature, and I only found one case of chimney-sweeps' cancer by Dr. Zoude many years ago. Then I went to Belgium and other places, and wrote to distinguished medical men like von Esmarch and Koenig and other people; I went to Antwerp and Brussels, and saw the principal operating surgeons in those towns, but only one of them had ever seen a case of chimney-sweeps' cancer. They had heard of it, and regarded

it as an English disease. Drs. Schvooen and Ceuterick had both seen a case in consultation, and the patient had been operated on in private. I mention Germany and Belgium particularly, because the conditions are precisely similar to those which prevail in this country, where hard coal is burned. The hard coal comes from the North of Germany and Belgium, and some by way of Hull from England, so that a good deal of it is actually the same coal. It is burned in open fireplaces, as in this country, and flues are used in precisely the same manner as in this country. I found that practically the disease did not exist in those countries, and I wanted to find out why. I therefore went myself or sent a messenger to those countries, in order to see how the thing was done. We went to the working sweeps' houses, to the master sweeps' houses, and we found that these costumes which I have here are made by the sweeps' wives (*producing same*). One of them was made in Holland, and the other one was made in Germany by a sweep's wife in Hanover. (*The witness produced two figures.*) If you talk to an English sweep on the subject, he will probably remember that some member of his family has died of cancer, but in the countries I have mentioned the people engaged in the occupation not only have no knowledge of any disease which is incidental to their trade, but they believe that it is a remarkably healthy profession, and the reason they give for its being healthy is that they wash themselves so much more than other people do.

1949. What is the special purpose of those particular costumes; what are they designed to do?—It is only when the sweep is walking about the street that he wears a hat. When he is at work his blouse is tied round the waist and the wrists; he wears a little skull cap and over it a hood. Then, over his mouth and nose he always wears a cloth, and this blouse is fastened closely about his neck, so that the soot reaches his body with very great difficulty, if at all. Then, in the afternoon, as soon as he has finished his work, he goes home and washes right down to the waist. In Switzerland especially they have beautiful underground warm bath rooms, where they wash from head to foot every day, and some of them actually wash their shirts as well, when they have finished washing themselves. This other model has gaiters on, but, to begin with, he has the hood and blouse all made in one piece. This garment is tied tightly round his neck, and tucked inside his trousers, which are fastened tightly. He wears tight-fitting sleeves, and on the lower part of the trousers he puts these gaiters and fastens them so that the soot cannot get up his legs. I have here a specimen of the actual cloth which he wears. It is a washing material, and is washed perhaps once a week or once a fortnight. This is a specimen of the stuff which is used very largely by sweeps, which was bought at Lille. It washes exceedingly well.

1950. Then is the special purpose of those costumes to prevent the soot reaching the skin of the body?—Yes, and the men take precautions that the soot does not get into the mouth and nose.

1951. What is the advantage of that?—They do not like it. I never heard of the use of a cloth over the mouth in this country till the other day, when I went to see a man named Vale, who is the sweep at St. Bartholomew's Hospital, and he told me that his men sometimes covered the mouth and nose with a cloth like this. I said, "Do not you do it?" and he said, "No, I do not do much sweeping but when I go myself to sweep sometimes when they are sweeping at St. Bartholomew's, I do not like it because I get my mouth and my palate all covered with soot." Sweeps suffer from consumption tremendously; the mortality from consumption amongst them is very heavy indeed. I have not the latest figures, but the mortality amongst sweeps stands at 260, as compared with the agriculturist at 106, while even in the Potteries the figures are only 333, and in the knife grinding industry 382.

1952. (*Professor Allbutt.*) To what do you attribute the diminution which has taken place in this disease; do you think it is due to individual precautions?—Yes. I have made enquiries during the last few days, not so many as I should have liked to have made—and amongst others I have been to my own house sweep, who tells me that generally the men engaged in the trade are cleaner than they used to be.

1953. Do you think that there is a sort of elevation

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of public opinion amongst them?—Yes, and I suppose there is a better water supply than there used to be 20 or 30 years ago, and they can get water much more easily.

1954. But still there is a higher conception of cleanliness amongst them you think?—Yes.

1955. The men who do the work are in no way drilled into it by their employers?—No. So little do they know anything about the ordinary habits of the sweep that the man who makes the arrangements for sweeping is more like a clerk in good employment than anything else. He comes with a cigarette in his mouth, and looks anything but a sweep. I questioned him with regard to the work and the habits of the men in his employ, but he could tell me very little, and said that if I would go round to his place one morning, between 9 and 10, his foreman would tell me all about it, but at that moment he did not know anything about it at all.

1956. Then the improvement you think is not the result of any pressure on the part of those above, but is a spontaneous movement on the part of the workers?—Yes.

1957. During the last 20 years, and from your past knowledge with regard to the matter, do you say that the relation of cured cases to all cases has been continually increasing?—I say as compared with cases of cancer generally the returns are extremely good. There had never been any published statistics until some years ago, when I looked up the histories to see what had happened to sweeps, or to persons with cancer of the scrotum, who had been operated upon years previously, and I found that the results of the operations were not quite so good as for cancer of the lip and face, but they were not very far behind.

1958. In speaking of the diminution of deaths, do you think that improvement in surgery has contributed to that diminution?—I should suppose so. You would not expect a man to die now because of the removal of a portion of the scrotum. People do not die from the result of operations now as they used to do.

1959. Do you find that there are by the improvements in surgery a very much larger proportion of recoveries than there would otherwise have been?—Yes.

1960. So that would affect the mortality, I suppose?—Yes.

1961. I suppose it might be the case that something like the same number of persons were affected, and that the diminution of deaths might be due to surgical skill?—Yes. You asked me a question just now with regard to the improved habits of these people. I should like to say that Mrs. Butlin has taken a great interest in this matter, and has been to the houses of these people; in fact, she has been my messenger when I could not go myself. She got these clothes and things which I have produced, which I could not have got because if I myself had gone amongst the people they would have looked upon me with suspicion. She, however, could talk to them, and she got these things which I could not have got. She asked a young sweep, who was sweeping in my house about two years ago, if he had ever heard of any disease connected with his trade. He replied that uncle had died of it, and added that it was because he did not wash himself.

1962. How far does the presumption carry you in any individual instance that a case of cancer is chimney sweep's cancer, because the point might arise with regard to compensation: Is this man's cancer a trade cancer—that is to say, a chimney sweep's cancer? I quite understand that as regards the scrotum there might be a very strong presumption indeed, but how far would the symptoms carry you otherwise?—They would not carry you far.

1963. It must be cutaneous, must it?—It must be cutaneous. If I were a judge in the matter I should not listen to anything else. It must be apparent on the outer surface.

1964. It is a matter of speculation, I suppose, as to whether internal cancer might or might not be due to the occupation?—Yes.

1965. Is there a colliers' cancer?—No. I took a great deal of trouble to find that out. I wrote to several people connected with collieries and so on, and communicated with them in various ways, but I could

not find that there was any collier's cancer, and, more than that, if we take the men employed in coke works, where they have to work in front of furnaces nearly naked, where they are covered with filth and dust, as I have seen them myself, I have never found but one case of cancer of the scrotum, and it was looked upon as an extraordinary rare occurrence.

1966. May I ask you whether in other dusty occupations cancer may result?—Yes, in the case of tar workers. The material gets into the scrotum, just as in the case of chimney sweeps. The workers get crude paraffin into their skins; they get it rubbed into them. It has occurred in Scotland and in parts of Germany, and we have had cases from Barking, where there are factories in which the men have to work with crude paraffin. I have made inquiries with regard to the progress of the disease of late years, and I find that it has been almost completely wiped out owing to the precautions which have been taken, after the consequences have been pointed out. In these places they can dictate to the workmen what they are to wear, and whether they are to wash or not, and the consequence is, as far as I can ascertain, that the disease is dying out entirely. It is the same disease, and is due perhaps to exactly the same cause, namely, preparation of the skin to take cancer.

1967. Do you regard warts as an early phase of cancer or merely as a previous disease of the skin which predisposes to cancer?—It is a predisposing disease of the skin, I suppose.

1968. The warts you refer to are the same, are they, as ordinary warts—they are not really cancerous?—No, because they exist for many years. The disease almost always begins in the wart, or in the form of a wart, but it might be one of many warts.

1969. The cancer would be superimposed on the wart, would it?—Yes, the wart is a good place for cancer to take root, so to speak.

1970. With regard to the protection of the mouth and nose, to which you referred, the precaution in the first instance, I suppose, would be in order to protect such parts as the lip and the nostril from epithelioma?—No, I fancy from what the man Vale said to me that in the first place it is done because they dislike the taste of the soot in their mouths; the soot goes up their noses and into their mouths, and I suppose it irritates them. I have no doubt it makes their occupation a very thirsty occupation, and there is no doubt they drink heavily.

1971. Do you think there is no great danger of cancer on the nostril or lip?—They do get it on the lip, but not often on the nostril, and they also get it in the mouth.

1972. And the handkerchief, you think, would protect them from that?—Yes.

1973. Would you suggest that it would have a still larger function, namely, the protection of the lungs?—Yes. The subject is dealt with in Oliver's book, in which Dr. Tatham wrote an article on dust diseases, and pointed out particularly that sweeps are liable to lung diseases in consequence of the soot going down.

1974. Do I understand that you would include chimney sweeps' phthisis in the same category as grinders' phthisis and general dust phthisis?—Yes. I do not see how one can come to any other conclusion; it seems to me to be a reasonable conclusion.

1975. We have no reason, have we, to suppose that the inhalation of dust in coal-mining produces phthisis, though a collier's lungs become as black as your hat?—I find amongst coal miners the figures are light as regards consumption, but heavy with regard to diseases of the respiratory organs.

1976. Coal miners are subject to bronchitis and that sort of disease, are they not?—Yes.

1977. My question was rather directed to lung diseases which develop into tuberculosis?—These cases in colliers are very low. There is no doubt that soot is a tremendously irritating substance.

1978. Is it more irritating than coal-dust, for instance?—Yes.

1979. For a collier's lungs are loaded with carbon?—Yes. I have had all kinds of chemical tests made. I had Dr. Hurtle at work for me at St. Bartholomew's, for a year or two, and I thought he would be able to isolate something from soot which might be found also.

in crude paraffin and tobacco, but when it came to isolating these organic substances it was very difficult.

1980. There is some unknown quality in soot, you think, other than grittiness, which makes it peculiarly irritating?—Yes.

1981. Speaking generally from our point of view, which is that of trade compensation, do you think that chimney-sweeps' cancer, in its present greatly reduced frequency, is of practical importance. There would be a certain amount of trouble in registration, and that sort of thing, to be incurred, and I should like to know whether you think it would be worth while to incur all this trouble now that chimney sweeps' cancer is so much reduced in prevalence?—Of course, the difficulty in answering that question would be that I do not know how much mischief you would allow in other businesses. I have no sort of basis to go upon.

1982. Would you consider the disease to be still prevalent or rather a matter of history?—It is still prevalent. I should think it is more a matter for great town councils, like the London County Council, to take up and deal with. I think they could make sweeps as healthy as any other members of the community. They could deal with the matter very much better, I think, than any other body.

1983. But we have to consider our present duties and responsibilities, you see?—Yes; but supposing it is pointed out that these diseases are dangerous and are due to want of care, and that claims might arise in certain instances, then I think legislation by the towns would do all that is necessary.

1984. (*Chairman.*) It is not really within the function of this Committee to consider the prevention of these industrial diseases. Our Reference is to consider what diseases should be included within the Schedule to the Workmen's Compensation Act. A question which arises with regard to that is, to put it briefly and simply, whether, if the sweeps kept themselves clean, do you think they could avoid this disease?—Yes, without a doubt. They avoid it in other countries where the conditions are precisely the same as they are in this country, and therefore there is no possible reason why they should not avoid it here. I have no hesitation in saying that. The evidence is as clear as can be that the disease can be prevented.

1985. (*Professor Allbutt.*) Since your resignation of your Chair at St. Bartholomew's you are not in so good a position, are you, to tell us what the degree of the prevalence of this disease is at present?—No; and there is another difficulty. I find, though we have cases still, the disease has never been frequent in one particular hospital. In addition to which, nowadays, operations are going on in all sorts of places, such as sick asylums, infirmaries, and so on, so that there must be a large number of operations which never appear in any statistical form. Therefore, we can only form a judgment from the cases which occur at the great hospitals of London, ten or eleven in number, which publish statistics, but they do not tell you the whole thing; they only give you an idea—nothing more.

1986. (*Dr. Legge.*) Can you tell us anything about the conditions of employment of chimney sweeps? Are they their own masters?—I can tell you in this country. For instance, my sweep employs so many people. I send to him, saying I want my chimney swept, and he says, "I will send a man up." He employs a man at so much a week, but he does not know anything about his habits. He is merely the agent between the man and me.

1987. He is not really the employer in the sense of employing him for trade or gain, is he?—That I am not quite sure about. I could find that out.

1988. It would influence the question, I think?—In the North German towns, Hamburg and so on, and in the Belgian and Dutch towns, they have men appointed to certain districts; they are what are called the *Ramoneur Juré*. They sweep districts of the town, they are the recognised people. You may go to any other sweep and have your chimney swept, but if it catches fire and nas not been swept by the *Ramoneur Juré* you are fined. They allow you to

employ what we should call a quack, but you do it at your own risk, and are responsible if your chimney catches fire, whereas if you have the certificate of a *Ramoneur Juré* I suppose they fix upon the authorised man and not upon you.

1989. But there are a great many chimney sweeps here who are their own masters, are there not?—Yes. I have visited some of the places where these men live, and have found them filthy dirty. Sweeps live in the same houses generation after generation, and are very easy to find.

1990. When you have asked an agent to get a chimney sweep to sweep the chimney, do you pay the agent?—We pay the agent always. We suppose that the sweep belongs to him.

1991. Do you know if there is any association of chimney sweeps?—I think there is one now. I think I have seen it quite recently in the Directory. I think there is a *Ramoneur Association*, which employs a considerable number of people.

1992. With regard to the question of the comparative mortality figure, which you gave for the years 1890 to 1892, 44 as amongst generally occupied males, and 156 as amongst chimney sweeps, can you say how that comparative mortality figure is arrived at?—No, I am sorry to say I could not.

1993-5. Among 64,641 males between 25 and 65 years of age there were, out of 1,000 deaths, 44 from cancer in a year, and, according to the death rate found, there would have been 156 deaths from cancer among a similar number of chimney sweeps and at similar ages?—Yes, I know they had to modify it in order to get a general basis of comparison.

1996. (*Chairman.*) In what period is that?—From 1890 to 1892.

1997. Is there anything in that book to show how many cases of death from chimney sweeps' cancer there are on the average for the year?—They take three years. Sixty-one sweeps in those three years died of cancer.

1998. In the whole country?—In the whole country, besides those who had it, and did not die of it—who were operated on.

1999. So that there would be 20 deaths a year from chimney sweeps' cancer?—From cancer in chimney sweeps. When we speak of chimney sweeps' cancer we mean of a particular part.

2000. Have you any idea in your own mind by how many that would have to be multiplied in order to arrive at the number of cases?—No, I do not think there are any means of arriving at that at all.

2001. But the number of persons who suffer from the disease would be very considerably larger than the number who die from it?—Yes, a great many more, because it is very successfully dealt with. I should not like to make any exact statement, because it would be purely theoretical. It might be half as many again, perhaps twenty or something of the kind in each year.

2002. I suppose almost all working chimney sweeps are their own masters or work for small employers?—Yes, they do not seem to work, unless this new association has a large membership, in bodies of more than two or three; not more than two or three work for any single individual.

2003. Is there any trade union amongst them?—I do not know. If there is it is quite new.

2004. (*Professor Allbutt.*) Are boys employed in chimney sweeping now?—No, not since 1840; but they are employed in Belgium and North Germany and Holland, little tiny boys.

2005. Have you anything to say about the question of age?—I have not the least doubt, looking at the diminution, say from twenty years ago, when the figure of mortality was enormous, 290 as compared with 150 at the present time, that the old sweeps who had begun as children added very materially to the number of persons who suffered and died from cancer, because they began at an early age, and had soot about them for many years, but though little boys are employed in foreign countries they do not suffer from cancer, yet they go up the chimneys.

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Mr. FRANK SHUFFLEBOTHAM, M.B., called in and examined.

2006. (Chairman.) Are you a medical man in practice at Newcastle-under-Lyme?—Yes.

2007. Are you in a position to give the Committee evidence on various diseases affecting pottery workers and also affecting coal miners?—Yes.

2008. How long have you been in that district in practice?—For six years.

2009. I will take first the pottery industry. There is, of course, a disease from which the workers suffer, due to working the lead?—Yes.

2010. That we do not propose to investigate, because it is already included in the schedule to the Workmen's Compensation Bill; but there are in addition other diseases, are there not?—Yes.

2011. What diseases do the workers specially suffer from?—The two diseases which I wish to mention are both rare diseases, but there are occasional cases which crop up. One is fibrosis of the lung, and the second is very much rarer still. It is dermatitis, which affects dust-tile workers, and also those operatives engaged in what is known as fritting.

2012. Taking first of all fibrosis of the lung, from what cause does that arise in this particular trade?—It arises from the irritation caused by the constant inhalation of clay or flint dust.

2013. (Professor Albutt.) Dry clay dust?—Yes, dry clay dust.

2014. (Chairman.) Can the symptoms of the disease caused by it be differentiated from other similar diseases?—Yes, quite easily, when the examination is a careful and systematic one, and when the operative who suffers from the complaint has been observed for some time.

2015. For how long?—That all depends on the individual case. I think in the notes I sent you I have made some remarks about certain difficulties, but I meant that difficulties would arise from a superficial examination, say, of five or ten minutes' duration.

2016. When you say "after having the patient under examination for some time," do you mean by "some time" a period of days, weeks, months, or years?—A period, say, of a few days.

2017. Then with certainty could you say that the disease was fibrosis of the lung and not some other lung disease?—I think so.

2018. I suppose it could always be distinguished by autopsy?—Yes, it could be, but there might be difficulties in the way. If an operative dies from fibrosis of the lung, other conditions may have arisen which may have aggravated his symptoms and actually caused death. For instance, a man with fibrosis of the lung, who has it in such a severe form that he dies, most probably—in fact for certain—has chronic bronchitis and emphysema as well. Of course, as everyone knows, chronic bronchitis is a common complaint, and because a potter has chronic bronchitis it does not follow that it is brought on by his occupation.

2019. Supposing you discovered the symptoms of fibrosis of the lung in the case of a man who had died, would you be able to say that the death was due to that disease, to use the words of the Workmen's Compensation Bill?—Yes.

2020. That, in other words, he would not have died but for that fibrosis?—Yes; fibrosis would be the primary cause.

2021. The disease, of course, is of gradual growth?—It is, extending over some years.

2022. If a man was incapacitated from work owing to this disease, you could not say, could you, that his incapacity had been due to his work during the previous twelve months?—Oh, no; I do not think so.

2023. Would it be possible for a man to be working in a process in the pottery industry, which is likely to give rise to this disease, and having thereby got the seeds of the disease into him, to go to some other process, and a year or so afterwards develop the disease which would then become apparent and incapacitate him?—No; by changing his occupation I do not think it would be apparent.

2024. I ask the question because the Workmen's Compensation Bill says that employers who employ a man during twelve months previous to incapacity may be made liable to pay compensation; but I understand you do not think it possible that an employer who had employed a man more than twelve months previously should, in consequence of the bad condition of his workshop, be really responsible for the growth of the disease?—In a case of fibrosis of the lung I do not think twelve months makes much difference under the present conditions which prevail in the Potteries.

2025. In what sense do you mean it does not make much difference?—In this way: At present, if the provisions of the Factory Act are carried out, it is very nearly impossible for a man to be put under those conditions where he can get fibrosis of the lung.

2026. But cases, nevertheless, still occur?—Yes, but not in young people, only in old people who have worked years ago under the old conditions.

2027. Then is the disease gradually disappearing?—It is more than gradually disappearing; it is very fast disappearing. I can illustrate this by the statistics I have taken from the reports of the North Staffordshire Infirmary. I have taken them for three periods of six years. From 1873 to 1878 the total number of cases, both surgical and medical, admitted into the infirmary was 7,788.

2028. Cases under what head?—That is under every head—the total number of cases. But of this number 113 were cases of fibrosis of the lungs. For one special disease of the lungs, and especially for a chronic disease, that is a large number.

2029. (Professor Albutt.) How is that number ascertained?—It is obtained from statistics based upon the medical reports of the physician of the Infirmary at that time. These figures are given on Dr. Arlidge's authority. During those six years there were 113 cases of fibrosis of the lung, and considering it is only one complaint, and considering the patients would stay in the hospital for a considerable amount of time, that is a very large number. Then the next period of six years I have taken from 1892 to 1897. I should have liked to have taken a period of six years between, but the volume of hospital reports had been borrowed, and it was not known where it had gone to, so I could not get the figures. But from 1892 to 1897 the number of patients admitted into the hospital was 11,650. Of that number there were 124 cases of fibrosis of the lung. During the last six years, up to this year—the annual report being made up to yesterday—there were 12,881 total number of cases, and only 5 cases of fibrosis of the lung—5 cases in the last six years. If the figures are worked out on the basis of 10,000 cases, it comes out in this way, that during the first six years there would be 145 cases; during the second six years, 107, and during the third six years 4 cases.

(The Witness handed in the following statement):—

POTTERY INDUSTRY.

FIBROSIS OF LUNG.

Statistics of cases from reports of North Staffordshire Infirmary, Stoke-upon-Trent:

| Year ending November. | Total Number of Inpatients both Surgical and Medical. | Total Number of cases of Fibrosis of Lungs. |
|-----------------------|---|---|
| 1873 | 1,296 | 46 |
| 1874 | 1,199 | 12 |
| 1875 | 1,270 | 14 |
| 1876 | 1,141 | 5 |
| 1877 | 1,329 | 23 |
| 1878 | 1,553 | 13 |
| Total for 6 years | 7,788 | 113 |

POTTERY INDUSTRY.—*cont.*

FIBROSIS OF LUNG.

| Year ending November. | Total Number of Inpatients both Surgical and Medical. | Total Number of cases of Fibrosis of Lungs. |
|-----------------------|---|---|
| 1892 | 1,887 | 22 |
| 1893 | 2,030 | 12 |
| 1894 | 1,984 | 8 |
| 1895 | 1,880 | 32 |
| 1896 | 1,957 | 29 |
| 1897 | 1,912 | 21 |
| Total for 6 years | 11,650 | 124 |
| 1901 | 2,047 | 2 |
| 1902 | 2,149 | 0 |
| 1903 | 2,159 | 0 |
| 1904 | 2,085 | 1 |
| 1905 | 2,201 | 0 |
| 1906 | 2,240 | 2 |
| Total for 6 years | 12,881 | 5 |

or worked out on the basis of 10,000 as the total number of cases the proportions would be:—

| | |
|---------------------|-----|
| 1873-1878 | 145 |
| 1892-1897 | 107 |
| 1901-1906 | 4 |

These years have not been specially selected to show the greater contrasts between the number of cases 30 years ago and now. I was obliged to take them, because prior to the seventies the nomenclature of the diseases of the respiratory organs was unsatisfactory, and also because there was a volume of reports missing between 1880 and 1890 or 1891.

2030. (*Chairman.*) Those are very striking figures. In your opinion do they point to a very large and real diminution in the prevalence of the disease, and not merely to a different practice of diagnosing?—The figures point to a real diminution in the prevalence of the disease.

2031. In your ordinary practice in the district you practically never come across a case of this disease now, do you?—Very seldom.

2032. And then only among the older workers?—That is so. But at the present time, I must say, I have two people under my observation suffering from this complaint, both of them over sixty years of age.

2033. Are you sure in your own mind that those two persons have contracted the disease through their employment?—Yes, I feel certain of that; but I also feel certain that it was years and years ago that they contracted it, because they have each suffered from it for thirty years.

2034. Then it would be exceedingly unjust to make the employer who had employed them within twelve months pay compensation in case they die?—Certainly. I do not see how it is possible for this disease to be contracted at the present time under the present provisions of the Factory Acts which are now in operation. There is very little dust in the factories.

2035. There is another disease you mentioned as prevalent amongst the tile makers—dermatitis?—I would not like to say prevalent, but existing. That is a disease that I have seen little of. I have made inquiries about it, and while my inquiries point to cases being known, still it is a rare disease.

2036. It is called dermatitis?—Yes.

2037. What is the cause of that particular class of

disease?—It is an inflammation of the skin over the hands and wrists, caused by the irritation of the dust among dust-tile workers, and it is also found less frequently among those engaged in fritting.

2038. What is the process of dust-tile making?—The process is this: the dust consists of very finely-powdered clay, flint and stone mixed together, containing sufficient moisture—a small percentage—to make the dust adhere together when sufficient pressure is put upon it. The tile is made from this dust by means of a press and a die. The complaint is caused by the irritation of the dust on the hands.

2039. Have you any statistics showing the degree of prevalence of this disease?—No, I have not, and they are difficult to get. I made inquiries at two large tile works yesterday in Burslem and Hanley, both established, I believe, for thirty years, and neither of them have had a case.

2040. Is it a disease which can be differentiated with certainty from other diseases?—Yes.

2041. If you saw a case of it you would say at once that the man suffering from it must have been engaged in this particular process?—I do not say one would make a lightning diagnosis of the disease, but on inquiry I think one could come to the conclusion that the disease was due to the nature of the occupation.

2042. Are the symptoms of it different from the symptoms of other skin diseases?—The symptoms are characteristic, but it is not confined to the pottery industry alone. I have seen this dermatitis found among workers in other industries.

2043. But is it always due to some industry? Could not a man contract it in his own home?—No, I do not think so in the form that I have seen it.

2044. But the disease is so exceptionally rare, is it not, that it may be hardly worth while including it in an Act of Parliament?—I think it is very, very rare, and I cannot get any statistics from anywhere. The infirmity reports do not give statistics. The medical men of whom I have made inquiries admit that they see cases rarely, and that they are due to the nature of the work; but it is certainly a very rare disease.

2045. How many cases would you come across in a year, do you think?—One may go a year and not see any. Dr. Hill, the certifying Factory Surgeon for the Tunstall District, told me two nights ago that he had only seen one case in twelve years.

2046. (*Professor Allbutt.*) Your evidence is so satisfactory as to the reduction in these cases that a very close examination of it scarcely seems important. We know that if such cases do occur, fibrosis in the early stages could usually be discriminated from other forms of pulmonary disease?—Yes.

2047. Did you ever discover clay-dust in the sputum of such persons?—Yes.

2048. By liquefying the sputum and spinning it, I suppose?—In some cases one can see it quite easily. By putting a little of the sputum under the microscope one can see it.

2049. And did you take steps to ascertain that it was clay-dust?—Yes.

2050. And so incorporated with the sputum that it could not have come just from the mouth, but came from the lung, in your opinion?—Yes.

2051. Can you give us any idea of the length of time the disease would take to develop? I suppose some people are attacked sooner and some later?—Yes.

2052. And the habits of each individual would have to be considered, I suppose?—Yes, and the home surroundings.

2053. Supposing the affection is once set going by inhalation of clay-dust, and then a man goes to some other employment and no longer inhales dust, would the lung disease thus started be progressive in itself without the continuous inhalation of the dust? Having once begun, do you think it would be likely to go on establishing itself?—I think the Chairman said after 12 months. If a man worked for a year or two, and was found to have something pointing to fibrosis of the lung, and then went to another employment, after a few years would one expect him to recover? That is how I understood the question.

2054. Let me put the question the other way. How

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far in a case, which is well established, is removal to a non-dusty employment: curative, or would the thing go on anyhow if once started?—I do not think so. I think if it were taken early at first, and perhaps after 7, 8, or 10 years, the man were removed from the employment to a more healthy employment, it is quite possible he would recover. One sees very striking examples of that in the coal-mining industry. One often finds at a post-mortem examination a man whose lungs are impregnated with coal-dust, but who has never shown any clinical symptoms of fibrosis of the lung.

2055. To pass to another point, the figures which you gave up to yesterday show an enormous reduction, do they not, in the number of cases of fibrosis?—Yes.

2056. They suggest some fallacy on the face of them, do they not? Would your experience lead you to anticipate that enormous reduction?—Yes, I think so, because the disease is so very infrequently found.

2057. So that you are not surprised?—No, not at all. I would have expected the diminution to be more gradual between those years. I was rather surprised there were so many between 1892 and 1897; but I am not at all surprised at the small number now.

2058. It is not really more than the ordinary incidence of pulmonary fibrosis in any district, is it?—No.

2059. In fact, less, you might say?—Quite so.

2060. It is certainly not more than what one might call a common prevalence of such a disease?—That is so.

2061. Can you suggest how far that reduction has been brought about by improvements in the condition of the work and the factory?—I believe it is entirely due to those improvements.

2062. Perhaps you will tell us what measures, in your opinion, have been really effective in bringing about the diminution?—The systematic ventilation of the workshops.

2063. (Dr. Legge.) Do you mean mechanical ventilation by fans or window ventilation?—Both. Especially fans and also the systematic cleansing of the workshops from dust, and allowing a certain time to elapse before the employes are admitted into the workshops after being cleaned.

2064. (Professor Allbutt.) Do you include the use of respirators?—No.

2065. The fans and ventilation and cleanliness have been sufficient?—Quite sufficient.

2066. Has there been any great diminution of the use of alcohol among the workers, do you know?—Yes. I should think that the Potteries have shared in the decrease in drunkenness in the same proportion as the rest of the country.

2067. There is no very direct connection between the diminution of fibrosis and the decrease of drunkenness, you think?—I do not think so.

2068. Then, to turn to dermatitis, that is to an expert easily distinguishable, I suppose, from ordinary eczema?—Yes, it would be.

2069. It is a definite complaint?—Yes.

2070. (Dr. Legge.) On the point of dermatitis, have you had cases under treatment of dermatitis in the process of colour-blowing, for instance?—No.

2071. Have you heard of them?—No, I have not.

2072. (Chairman.) But you have heard of some cases amongst those engaged in fritting?—Yes.

2073. (Dr. Legge.) But fritting would be dust, and what I am referring to is a liquid?—I have not heard of any such cases.

2074. Although you said, I think, that dermatitis was very rare in the Potteries as a cause of illness and as a trade disease, all over the country there would be a large number of cases, would there not?—I am not prepared to answer that question. I have seen it in other industries, and I believe—of course, I am only speaking from what I am told—that it is somewhat prevalent among the dyers and bleachers in Lancashire. I saw a very characteristic case in a bleaching and dyeing mill near Congleton some time ago. I was told that this complaint was well known there.

2075. Do you remember what the cause of it was in that instance?—It was due to the mixing of the colours. I asked the man if it was chromate, and he said it was not—that they did not use chromate at all. I have inquired about chromates in the Potteries, but I do not know of any pottery where it is used for the purpose of colouring the tiles. The colours most frequently used are the oxides of cobalt, copper, manganese and iron.

2076. Have you seen the lungs of a person who has died of potters' asthma?—Yes.

2077. Does it resemble this plate at all (*exhibiting same*)?—I have seen this plate before, too. Yes, I think it does. I take it that that is a typical case of fibrosis of the lung.

2078. Have you compared with this list of cases of fibrosis of the lungs, which you have given from the Infirmary, a similar list of phthisis?—I did, as a matter of fact, but I have not got it here.

2079. Is there a diminution in them?—I could not say. I took a great number of years, and did not add them up, but I could give the figures. But I would like to say this with regard to the tuberculous diseases of the lung that are put under several headings, and the classification varies from year to year. For instance, acute tuberculosis, acute phthisis, chronic tuberculosis, cirrhosis of the lung, and so forth, so that by a simple glance at the figures I am not able to answer your question.

2080. Were these cases headed, "Fibrosis of the Lung"?—Yes; potters' asthma and in some cases of late years silicosis of the lung.

2081. Included in the list of phthisis cases do you think there are likely to be cases of fibrosis of the lung?—I do not think so, for this reason: That every case of fibrosis of the lung that goes into the infirmary would be under observation for some weeks, and the physician who has charge of the case would, during those weeks, be able to make a differential diagnosis between fibrosis of the lung among potters and, say, a tuberculous disease of the lung. Of course, the statistics I have given are perfectly impartial.

2082. Did you find many of them combined with tubercle?—No, tuberculous cases are put down under most definite headings.

2083. Have cases of fibrosis known to be tuberculous been put under a separate heading, even though they were known to be potters' phthisis?—I cannot go beyond what I have said already.

2084. It would not be put down as potters' asthma, would it, by a physician at the top of his sheet?—It would be in the olden days. It is classed as potters' phthisis, silicosis of the lung, or some synonymous but still unmistakable term. The name given to it all depends on the house physician who edited the annual reports.

2085. What is the nature of the clay potters use?—It is a mixture of clay, flint, and stone.

2086. Do you know if there has been any similar reduction in the diseases of the respiratory system in the North Staffordshire Infirmary?—Very little reduction at all. I noticed that, but I cannot give you the figures. I have the classification of some of these diseases here, and it will illustrate how they are classified. In 1877, for instance, the total number of respiratory diseases amounted to 156, and of those phthisis was placed first, 72; potters' phthisis, 23; miners' phthisis, 9; acute phthisis, 8; bronchitis, 13; pleurisy, 10; pneumonia, 6; and asthma, 5. That were other less common diseases, bringing the total up to 156.

2087. Which do you include under fibrosis of the lungs?—Potters' phthisis.

2088. (Professor Allbutt.) Would that signify, on the face of it, apart from tuberculosis, the respiratory diseases are not specially common in your district?—I would not like to say that, because it is a question of the number of beds in the hospital.

2089-90. Can you give us any information from your general practice as to the prevalence of respiratory disease?—I think bronchitis is very common, and it is largely due to the fact that in the Potteries the sub-soil is clay.

2091. (Mr. Cunynghame.) I see you have put in some tables, showing a very remarkable diminution of

cases of fibrosis of the lungs, the diminution commencing at some date between 1897 and 1901?—Yes.

2092. Do you put that down in any way to any regulations for the conduct of the industry?—Yes, entirely so.

2093. At what date did those regulations come in force, and what were they?—I cannot say.

2094. That seems to me that that proves that regulations have reduced this disease, as it appears from the Infirmary Returns?—That is so.

2095. And, consequently, it follows, therefore, that it must be an industrial disease?—Yes, that is so.

2096. Or otherwise it could hardly have been affected by a change in industrial conditions?—Quite so.

2097. When a man is dead it is quite easy, is not it, to be certain that phthisis is fibroid and not tubercular, and caught from some other cause than the trade?—Yes.

2098. But before a man is dead, in a large number of cases, there will be some difficulty in making sure of that, I suppose?—There is no arbitrary line. If a man, a potter, has worked in a dusty atmosphere, and if he has acquired fibrosis of the lung, and eventually tuberculosis, then it would be difficult to say which had caused his death. But it is a remarkable fact that potters who suffer from potters' asthma very rarely acquire tuberculosis.

2099. Supposing a man came to you who had not been very long in the industry, and yet who exhibited symptoms of phthisis, what would you say?—Do you mean tuberculous phthisis?

2100. No, using the word phthisis in its more general sense, would not there be some difficulty, unless the case was under observation for some time, in being quite sure whether he had caught that disease as a potter or whether he would have got it even though he had been doing something else than potting?—If he had only worked as a potter for some time it would not be due to the nature of his employment.

2101. Would not there be some difficulty in the initial stages if a doctor was asked which of those two is it; is it fibroid phthisis or is it tubercular? Has it been caught from a trade, or is it a thing that might have been caught if he had not been in that trade? Would there, or would not there have been some difficulty in the diagnosis?—I think one could eliminate tuberculosis by making a bacteriological examination of the sputum.

2102. You think the sputum would give you a sufficiently sure indication, do you?—Yes.

2103. So that in your mind there would not be a very great difficulty?—No.

2104. Putting it in another way, to make quite sure, supposing that an insurance company were bound to pay upon any phthisis caught in the trade, but not bound to pay on phthisis caught otherwise than in the trade, and granting that phthisis is known, of course, apart from any trade, would it be an easy matter for a doctor, in any given case, to say whether the insurance company ought to pay or not. Would you undertake, as a doctor, and being absolutely just, of course, to pronounce with tolerable certainty between the two?—I think so, but I would like to say this: That if the disease be scheduled I have not the slightest doubt but what there will be a large increase in the number of these reputed cases—that every potter who has got a cough will think it is due to potters' fibrosis, and, in my opinion, there will be a lot of unnecessary litigation.

2105. But without the man necessarily malingering they will think so, no doubt?—If this becomes an Act I have not the slightest doubt they will read it with a microscope, and if they think there is a chance of their getting something because they have a cough, and because they are potters, they will naturally make a claim for it.

2106. (Chairman.) But a certified surgeon will be always able to meet any bogus case?—Yes.

2107. Before turning to miners' diseases and injuries—with regard to dermatitis, potters' eczema is the same, is not it?—That is so.

2108. Your remarks about dust-tile makers who contract dermatitis would apply equally to persons engaged in fritting, would they?—Yes; but there is no

necessity for anyone engaged in fritting to acquire dermatitis, because the process of fritting is such that they should use their shovel, spade, or trowel, instead of their hands. It is only when they use their hands that they get the complaint.

2109. Turning to miners, first, with regard to nystagmus, have you had several cases of that under your observation?—I have.

2110. Can the symptoms of that be easily diagnosed?—Yes, quite easily.

2111. Is it possible to imitate the symptoms?—No, the movement of the eyeballs in nystagmus is an involuntary movement, and consequently the worker cannot malingere.

2112. (Mr. Cunynghame.) If it be an involuntary movement, could not a malingering voluntary movement imitate it?—No.

2113. (Chairman.) Nystagmus does not necessarily incapacitate a man, does it?—Not necessarily.

2114. A considerable number of men at this moment are working in the mines who are suffering from nystagmus, are there not?—That is so.

2115. May the disease get so bad as to prevent a man working?—Yes, in a certain number of cases. I may say with regard to nystagmus in North Staffordshire, it is not at all common, but I believe it is very much commoner in the Sheffield district. Mr. Snell, I think, says that 5 per cent. of the miners suffer from it in that district.

2116. In your district what percentage of the miners should you say are suffering from nystagmus?—I could not give a percentage.

2117. Should you say it was rare?—I should say it was comparatively rare.

2118. For one man prevented from working, owing to miners' nystagmus, about how many should you think suffer from the disease, but not so badly that they are incapacitated?—A very large number; but I would not like to give any definite figure.

2119. A man who is admittedly suffering from nystagmus might claim to be incapacitated, I suppose, if he were able to obtain compensation, when really he might quite justly be considered fit to go on working?—I can best answer that question, I think, by making a suggestion. In my opinion, if this disease is added to the Schedule, it is most important that a staff of eye specialists should be appointed as medical referees for the purpose of investigating these cases. While it is a disease that can be diagnosed by surgeons in general practice, I feel it would be very much more satisfactory, both for the coalowners and the miners, if the cases were referred to experts, and these experts would also be of use in dealing with other eye diseases which are brought about through injury.

2120. That is a separate point, and is a suggestion which the Committee will be very glad to consider. But the point is, assuming you have at your command the best medical opinion in the country, would you be able to say with certainty whether or not a man admittedly suffering from nystagmus was suffering sufficiently to incapacitate him?—I think so.

2121. Nystagmus is distinctly a trade disease, is not it?—No, it is a symptom which is found in certain diseases of the brain and spinal cord.

2122. But it is much more prevalent amongst miners, is not it?—It is.

2123. Taking cases of nystagmus amongst miners, it would be a very remarkable coincidence indeed, would not it, if the disease were found to be due to some illness, and not to their employment?—I will not go so far as to say that, because miners are as subject to the common ailments of life as anyone else. But if a miner had a disease of the brain or spinal cord of which nystagmus is a symptom, I think it would be remarkable for him to have one of those rare nervous diseases and at the same time suffer from nystagmus due to his occupation.

2124. But he might suffer from nystagmus due to the other disease, might he not?—That is so; but nystagmus would not be the only symptom of those other diseases.

2125. And a doctor who examined him could always say, with certainty that he was suffering from some other disease that might give rise to nystagmus, could he?—Yes.

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2126. Have you any idea, in your own mind, of the frequency of those other diseases that might give rise to nystagmus amongst miners?—No; I cannot give you any statistics on that point.

2127. Are they obtainable?—I do not know.

2128-9. My point is this: Given 50 miners who have nystagmus, could you say that the probabilities are that 40 of the cases were due to their occupation, and that so many as 10 might be due to other nervous diseases?—I should think many more than 40 would be due to the occupation.

2130. So that perhaps it would be only one or two at the most which would be due to some other ailment? Perhaps so—and less than that.

2131. And in those cases the examining medical man could say this nystagmus is not miners' nystagmus, but is due to the spinal cord or other diseases?—That is so.

2132. To what process in mining is nystagmus due?—It is most generally found among those who are engaged in the process of holing.

2133. What does that consist of?—It consists in undercutting the seam so as to get out the coal in pieces as large as possible. The man lies in a constrained position on his side and strikes the coal at the bottom of the seam with a horizontal swing. In this work the muscles of the eyeballs are in a continually strained position.

2134. Can this disease be prevented by mechanical methods?—I am not prepared to answer that.

2135. Do you come across many cases of men who are suffering from the disease who are incapacitated by it, and cannot continue their employment?—No; I have not come across any case of nystagmus where the man has been incapacitated. I have come across no cases of miners where the man has been incapacitated through having nystagmus alone; but I have not the slightest doubt there are cases. I know there are cases where it does produce incapacity for work; but, taking the cases of nystagmus as a whole, the proportion of those where the man is incapacitated to those in which he is not incapacitated would be very small.

2136. Of course, it is a disease of very gradual growth?—Yes.

2137. If a man is incapacitated he might have had nystagmus for many years before he was actually compelled to give up working?—Yes.

2138. If an employer employed him for 12 months previous to his being incapacitated, there is no particular reason, is there, why he should pay compensation any more than any other employer for whom the man has been working during his working life?—That is so.

2139. With regard to miners' "beat knee," and "beat hand," have you had experience of those troubles?—Yes, I have.

2140. Are they both more or less of the same nature?—Yes, they are caused in the same way.

2141. Have you come across many miners who are prevented from working by "beat hand" or "beat knee"?—No, I cannot say that I have. I have seen both cases a good many times, but I cannot say I have seen a case where it has produced total incapacity for work.

2142. It is simply a sore, is not it?—No, "beat knee" is a chronic enlargement of the bursa over the knee-cap. It is similar to "housemaid's knee."

2143. Then "beat hand" is a sore, is not it?—"Beat hand" is a chronic thickening of the cutaneous and fascial structures of the palm of the hand, and it is associated with a contraction of the fingers. There may be soreness.

2144. (Professor Allbutt.) Do you mean by sore that it has a sore surface?—No, I mean that it is tender.

2145. (Chairman.) Are those things curable?—Yes, they are curable, but there are cases of "beat hand" which are not curable except by operation.

2146. Taking first "beat knee," it is easy to diagnose it with certainty, is it?—Yes.

2147. Is it distinctly a disease that arises from the occupation?—Yes, I think it does in miners. Of course, it arises in other occupations, too. As I have said, a housemaid may have it.

2148. But is it especially prevalent amongst miners?—It is found amongst miners. I think it is very difficult to say whether a man is incapacitated from it or not. If he says he is incapacitated, the doctor may know very well that he is not, but still, if he maintains that he is, it is very difficult to decide. There is no arbitrary line which can be drawn between incapacity and capacity for work.

2149. Have you personally had to treat many cases of "beat knee"?—I have not had to treat them in miners, but I have seen them casually in examining miners who have come to me for examination for injuries.

2150. But as a rule it is not a trouble that is bad enough for them to go to the doctor?—No, not as a rule.

2151. And do they get over it in course of time?—It all depends on what they do. Of course, if the cause is not removed, or if the man does not take care, it may remain in the same condition, or even become worse.

2152. But he can, with care, get rid of it without being incapacitated from his work?—Yes.

2153. With regard to the "beat hand," do the same remarks apply?—I do not think "beat hand" is any more a miners' disease than it is any other occupational disease.

2154. (Professor Allbutt.) Is it of the same nature as the so-called Dupuytren's contraction?—Yes.

2155. Which arises from handling tools?—Yes. In the last year I have seen it in the case of a tailor, a baker, a potter's mould-maker, an ex-Army instructor, a coachman, as well as in a manufacturer whose principal pastime was fishing.

2156. (Chairman.) Were the symptoms precisely the same in all those cases?—Yes.

2157. Have you come across any cases in which miners have been incapacitated from work by this complaint?—I cannot say that I have. I have seen miners with the complaint, and it is quite possible that there are miners who may be incapacitated from using their tools when the disease is in an advanced stage.

2158. Is it easily curable if taken in time?—It can be prevented from getting worse.

2159. Would a man have to give up work in order to undergo curative treatment?—That all depends upon the degree of severity. I would also like to say, with regard to miners, that the condition is aggravated after they have had a long holiday, or been ill, or on strike. The tools have either got rough or rusty, and that irritates the hands, and aggravates the symptoms of this complaint.

2160. (Professor Allbutt.) It might be due to a brief suspension of employment, the tissues having lost their habituation to the tool, and become more susceptible?—That is so; so that if there were a big strike, and this were added to the schedule, after work was resumed many men might claim compensation under the Act.

2161. (Chairman.) While if it were not added to the schedule they would go on working, and would soon get over it?—That is so.

2162. Are there any other industrial diseases on which you are prepared to give evidence?—I do not think so.

2163. (Mr. Cunynghame.) There is one question I want to ask you with regard to nystagmus. You said that very few men are incapacitated from work in a mine on that account?—As far as my experience goes, yes.

2164. Does not that answer somewhat depend on what one means by "incapacitated from work"? You may be slightly incapacitated so that you would earn a penny less a day than you would without the nystagmus, I suppose?—Yes, but when I answered the question I meant total incapacity.

2165. Might not there be a certain amount of partial incapacity which would give rise to no end of difficulty?—I think it is quite possible there may be partial incapacity from the nystagmus.

2166. And, consequently, instead of a small number of men, you might have a very large number of men suffering from more or less incipient and slight

nystagmus who might claim compensation for partial disability, and whose cases it would be very difficult to deal with?—Yes.

2167. We had it in evidence from Mr. Snell that in a low mine everybody had got it from looking upwards, and there was no other work, certainly below ground, which the men could do?—Of course, under those conditions that would be so, but I take it that a great deal depends on the working of the mine and the character of the working of the mine.

2168. I am taking a low mine, where you have to bend your head and look upwards; the axis of the eyes has to be upwards in regard to the skull?—The worker might have his work transferred to that of timbering or loading.

2169. But we have it in evidence that roof-ripping, for example, is one of the most likely causes to give it—that you are engaged in timbering and cutting the roof, and have to look upwards?—But still the timberer has assistants, and a man suffering from nystagmus might assist in that work.

2170. But he would still have nystagmus, and would urge that he was partially incapacitated from work accordingly, would not he?—Yes.

2171. So that it comes back to this, does not it, that you might have a very large number of very small claims?—That is so, and I have not the slightest doubt that if this disease be added to the schedule, greater attention will be paid to nystagmus in the future than there has been in the past.

2172. But unfortunately this does not seem to be a disease that there is any mode of preventing as long as the mines are low?—That is so.

2173. So that when you say greater attention would be paid to it you mean greater attention in curing it than in preventing it?—Greater attention would be paid to diagnosing the complaint, that is to say, the number of known cases would materially increase. Every miner would want to know whether he had nystagmus or not.

2174. I suppose, after all, you would say, as a medical man, that there are very few professions or trades in this country that do not bring about more or less some physical disability of some kind?—That is so. It is simply a question of being influenced by one's environments.

2175. Even cricket might bring about cricketers' hands?—Yes: "Beat hand." Or golfers might have "beat hands."

2176. So that there is a large amount of physical disability in the country that may be regarded as almost inevitable in a country which carries on professions, trades, or even amusements?—Yes, that is so.

2177. Then it could hardly be said, could it, of every single occupation where that occupation brings on some sort of physical disability, it should be treated necessarily as a physical disability, it should be treated trade?—Quite so.

2178. I suppose you would admit that a man must be prepared, who is earning his livelihood in some way or other, to submit to a certain amount of danger or physical incapacity from it, which only in certain cases becomes very serious?—That is so.

2179. You will agree perhaps that it is not everybody who can show that his profession has injured him, who could fairly have a right to claim compensation?—That is so. Take the case of farm labourers. They are subject to all the variations in the weather, and, consequently they are subject to rheumatism to a far greater extent than people whose occupations are indoors.

2180. So that if you proceeded to put everything into the schedule that could possibly arise out of an occupation, you would put rheumatism for agricultural labourers?—That is so.

2181. Then you would agree that, whatever the logic of it is, in putting diseases into the schedule there must be a clear and very strong case made out before you, as a medical man, could say that it was a disease that ought to be regarded as appertaining specially to the industry?—That is so.

2182. (*Professor Allbutt.*) So far as the holing operation is concerned, if the man works from the base, as I understand he always does, the thickness of the seam is not of much importance?—No.

2183. That would only concern the people engaged in running the coal, and so on?—That is so.

2184. Have you seen nystagmus arising in occupations other than mining?—I have seen it, but I do not know whether it is due to the occupation or not. This year I have seen a case in a coachman, who is coachman to a coalowner, but he has never been down a mine in his life.

2185. Do you know of any method by which you can ascertain whether a person affected with nystagmus is suffering from it or not?—Yes; there are cases where giddiness is associated with nystagmus.

2186. Still, that depends on a man's word, does not it?—Well, if he reels or staggers there is an objective symptom. I do not know of any other symptom.

2187. I mean the objective distress would not lead to a man losing flesh or becoming ill, or weaken his nervous system; that he might still retain the appearance of health although suffering seriously?—Quite so.

2188. To put the matter in another way, there is no direct relation, apparently, between the degree of nystagmus and the degree of incapacity?—A man might have nystagmus badly and not suffer, and another man might have nystagmus slightly and suffer?—Quite so. There is no relation whatever.

2189. Is the susceptibility high, do you think?—I could not say. In North Staffordshire it is much rarer than in the Sheffield district.

2190. But between man and man, do I understand that the variation of personal susceptibility is not very high?—I do not think so, except when working under certain conditions for a considerable period of time.

2191. One man might be affected very soon and another man, even if he ultimately got it, might be a very long time in getting it?—Yes, quite so.

2192. As regards the "beat knee," is that the enlarged bursa that you see in housemaids, for instance?—Yes.

2193. To which anybody who kneels is subject?—Yes.

2194. That is painful when in an irritable condition, is not it?—That is so.

2195. Do you practise surgery?—Yes, I do.

2196. It is within the resources of surgery to say whether the bursa is in a state of irritation or not, is it not?—That is so.

2197. And when it is in a state of irritation a man is unable to work?—He may be unable to work.

2198. And would you look forward to that being subdued by a certain interval of rest?—Yes.

2199. When, although he might still have bursa, it would be painless?—That is so.

2200. By the use of certain pads, such as are now regularly sold for housemaids, could it be prevented, do you think?—I suppose it could, at any rate, largely.

2201. As regards the "beat hand," if the contraction was extreme it would be awkward to use a tool, would not it?—Yes.

2202. And if it was the right hand it would be more awkward still, would not it, if the man was a right-handed man?—Yes.

2203. Even a non-medical man might form a fair opinion as to how far the contraction was such as to make it difficult to use a tool?—That is so, but the difficulty would be as to whether the condition was caused by his work or by some hobby. Suppose, for instance, a man was an amateur gardener and worked 4 or 5 hours with a spade each day, it would be difficult then to say how much the condition was due to his hobby, and how much to his work.

2204. We see it, do we not, in the cases of persons not engaged in manual labour who have probably, in some way, irritated or injured the hand, and a very slight cause has brought it on?—Yes.

2205. Is "beat hand" traumatic in origin?—If "traumatic" could be used to a most chronic condition. I should like to say, with regard to the coachman I mentioned (because it raises another point) suffering from nystagmus, he was the coachman to a colliery proprietor. He broke his arm and was not allowed to drive any more. As a matter of fact, he

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23 Nov. 1906. did get employment on the surface of the colliery, but had that man gone into the mine to work, it is quite possible that, say, in 12 months' time, if he had met with any accident, his eyes would have been examined in the ordinary way for nystagmus, and it might have

been put down to the nature of his employment, whereas he had it before.

2206. (*Mr. Cunynghame.*) You have explained, I think, that nystagmus might be contracted in other things besides mining?—Yes.

EIGHTH DAY.

Thursday, 29th November 1906.

MEMBERS PRESENT :

Mr. HENRY CUNYNGHAME, C.B. (*in the Chair*).

PROFESSOR CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Mr. WILLIAM MURRAY, M.D., called and examined.

Mr. W. Murray, M.D.
29 Nov. 1906. 2207. (*Chairman.*) What is your present position in Birmingham?—I am in general practice.

2208. Were you resident surgeon at the Birmingham General Dispensary from 1898 to 1900?—Yes.

2209. (*Professor Allbutt.*) Is that a public charity?—Yes.

2210. (*Chairman.*) Is most of what you are about to tell us derived from the experiences of those years, though you have come across some cases in general practice since?—That is so.

2211. What is the peculiar disease that you are going to deal with? What do you call it?—The name I give it is chronic brass poisoning; but I should like to say that in writing my *précis* I forgot to mention brass founders' ague.

2212. Are brass poisoning and brass founders' ague two different things?—They are two different aspects of the same condition.

2213. May we call it one disease—brass founders' disease?—The name I should prefer to call it is brass poisoning as a general term.

2214. Before you describe the symptoms of brass poisoning, can you say that it is a characteristic disease that could be picked out even though a practitioner did not know a man had been working in brass? If you saw a man ill, who was dumb, and who could not tell you what he had been doing, is the disease so sufficiently marked that you could say at once that the man had brass poisoning?—I think so; I think as definitely as lead poisoning.

2215. Will you tell the Committee in simple language what the characteristic symptoms are that mark it out, taking a strongly developed case first?—In the early stage the first symptoms would be those of anæmia; they would be accompanied by excessive debility, nervousness, neuralgic pains, and the teeth would show a green line at the bases.

2216. Is that an invariable symptom in the sense that if that green line was absent you would suspect it was something else; has that green line to be always present?—I should say so.

2217. You see what we are seeking for is something characteristics?—Yes, but I should like to explain that you may have the green line without any such disease at all. The green line would be antecedent to any other symptoms.

2218. But the green line would be characteristic of brass poisoning, would it?—It would always be there.

2219. Is it a different colour to what is known as the lead line?—It is a different colour, and in a different position. The lead line is on the gum; the green line is on the teeth.

2220. Without that green line would you be unable,

if you did not know what the man had been working at, to put it down definitely, or would you put it down that it was probably brass-workers' disease?—I would not put it down as brass-workers' disease without the green line.

2221. Does that green line assimilate to the symptoms of any other disease or condition that you know of?—Not that I know of.

2222. Then it is absolutely characteristic, is it?—Yes, unless we are to include copper poisoning, which probably is the same thing.

2223. Does copper poisoning produce exactly the same green line?—Yes, and it is undoubtedly the copper in the brass which is responsible for that green line.

2224. What would be the characteristics in later stages?—Emaciation, tremors, cold sweatings, cough, extreme weakness, and a greenish complexion.

2225. Is that greenish complexion again characteristic, so that if it did not exist you would be doubtful whether the disease was present?—No, I should not say so; I should not call it essential, because it is rather a sign of an advanced case.

2226. Still, if the case were advanced, would you expect to find that greenish complexion? If the man were very ill, very emaciated, and very bad, would you expect to find it?—I would.

2227. In a case where a man was very ill, and had some of the other symptoms you mention, but had not the greenish complexion nor the copper line, would you be able to pronounce that it was not the disease?—Yes.

2228. It is not then a disease that can be very easily simulated by a man malingerer?—No, I feel certain it could not be malingered.

2229. Not unless he were to paint his teeth in a very elaborate manner; in an ordinary way you think, do you, it would be a very difficult thing to simulate?—I think so.

2230. Therefore, do you think that a conscientious practitioner, particularly if he were provided with the clue by either the employer or the workman, ought to have no great difficulty in recognising this as characteristic of brass poisoning?—I do not think he should.

2231. Can you give the Committee any idea of the extent to which men in the trade are subject to this disease? Have you formed any estimate as to that?—I could not answer that question.

2232. When the disease is caught in the earlier stages, is it a difficult matter to cure?—I think it is very easy.

2233. How would you treat it?—I should put them under phosphorus treatment.

2234. How long would it be before a man would get over the disease?—With treatment or without?

2235. With treatment?—With treatment, in three weeks, approximately.

2236. Would it in the advanced stages incapacitate him perhaps for the rest of his life, or is it a thing that can be cured at any stage?—In my experience it can be cured at any stage unless we are dealing with complications. The disease itself can be cured quite easily at any stage.

2237. The more severe forms would take longer to cure, I suppose?—Yes, probably a week or two.

2238. Not longer than that?—I do not think it is ever a matter of more than weeks.

2239. Do you mean that the poison by proper treatment can be eliminated from the system?—Yes.

2240. Does a man become more likely to get the disease from having had it beforehand when he goes back again to his work, or not?—I should say yes, certainly.

2241. It is true, is it not, that the preliminary symptoms are got by a great many men at the beginning of their work, and that after a few weeks they become immune to the poison to a large extent, and can go on working?—After having first shown the symptoms, do you mean?

2242. Yes; I have heard or read somewhere that the men may suffer for the first few days, then apparently they seem to get accustomed to the poison, and go on without much inconvenience. Have you anything to say as to that?—Not from personal experience, because those would be the cases which would not come under my notice.

2243. Have you met with cases of vomiting connected with the disease?—Yes.

2244. Is that more or less a preliminary symptom?—I do not think I should call it a preliminary symptom, unless it is preliminary, say, to a person consulting a medical man.

2245. But it does bring on vomiting, does it not?—Yes, there is occasional vomiting.

2246. Do men die from the disease?—No, I feel sure they do not.

2247. In your opinion is this what it comes to: that it is a disease which, when caught, incapacitates a man for a period of from one week up to three or four weeks, but the poison can be eliminated from the system by proper treatment and proper rest, and then he is fit to go back to his work, when, of course, he may be poisoned again?—Just so.

2248. I suppose certain constitutions are more prone to take the poison than others?—That is so.

2249. What is the effect of habits of life, such as intemperance, and so on, in connection with this disease?—I think the condition is aggravated by intemperance, but that is not a point on which I should like to be very dogmatic.

2250. Have you formed any opinion as to the chemical nature of the substance that gets into the lungs of the men, and that causes the illness? I am afraid it is an extremely difficult question, but have you formed any opinion upon it?—The only opinion I can express is that it is due to the absorption of the copper more than the zinc, although it is possible the zinc may have some effect on them.

2251. Is there any work in bronze in Birmingham to any extent—bronze fusing or melting?—Yes.

2252. Is it the fact that the bronze workers and casters get the disease in the same way as brass workers?—I do not know.

2253. Of course, bronze would contain only copper and tin, and not copper and zinc, would it not?—I do not remember a case in which a man described himself as a worker in bronze.

2254. You have no opinion then, have you, to give on the question of bronze-casting factories as distinguished from brass works?—No, I have not.

2255. Do you attribute the disease, as far as your opinion goes, more to the copper in the compound than to the zinc?—Yes.

2256. Have you ever seen these factories and been into them?—Yes.

2257. There are clouds of white oxide of zinc which form round the ceilings after the pouring has taken

place, are there not?—That is so in the casting sheds, but those are not the places where we get these typical forms of poisoning from. We get those in the workshops where the filing, turning, and polishing is done; it is in the casting sheds you get the brass-founders' ague.

2258. The brass-workers' disease you are speaking of results from inhaling the brass dust, does it?—Yes, and principally inhaling the dust which is floating about in the workshop.

2259. (*Professor Albutt.*) Inhaling brass dust?—Inhaling brass dust.

2260. (*Chairman.*) Then there is a variety of the disease which is got by the brass founders, is there not?—Yes.

2261. Can you differentiate between those two diseases?—Yes; they are very different. The disease the brass founder suffers from is an ague. The whole illness lasts for perhaps a day. In brass-founders' ague the principal feature is shivering. It begins first of all with a feeling of depression and general pains, then a period of shivering comes, in which the man sits with his teeth chattering and with pains in his back. After a period in this condition he generally becomes very warm, and breaks out into profuse sweating, goes to sleep, and wakes up in the morning, not quite well, but in the course of the day it passes off, and the whole illness is over.

2262. Then do I understand the illnesses of the brass founders do not last more than a day in any case, and that is the whole extent of the illness?—Yes, vomiting is generally a prominent feature of that.

2263. But shivering is also a feature of the other disease, is it not?—Yes, but it is different, more like the tremors you find in a man addicted to alcohol.

2264. I suppose the fumes of the foundry are never fatal, in fact?—No.

2265. Have you any idea to what causes illnesses in brass foundries may be attributed or what form the copper or zinc fumes take?—No, I have not.

2266. Then brass workers' disease may occur in many trades, I suppose, where the filing of brass of any kind or sort is common?—Yes, where the raw brass is used.

2267. Does the raw brass ever get into the workmen's lungs; have you any evidence of that?—Yes.

2268. Have you found that from post-mortems?—I can only remember one case in which I did, because, as I have said, they do not die. I remember one case of a brass worker whose bronchial glands were cut out, and we found copper present in them.

2269. Did you find grains, or were they merely stained?—I got one of the men at the University to boil it down, and extract the copper, and he found traces of copper.

2270. Was it in the shape of grains, tending to produce such a condition as fibroid phthisis or any similar condition? Was it in that shape which steel dust takes when it gets into the lungs and produces fibroid phthisis? Was there anything of that kind in this case?—In this case the examination was purely chemical, not microscopical.

2271. Then you have not any evidence that this brass dust produces fibroid phthisis like steel dust or grindstone dust does?—I have no evidence that I could bring forward personally, but it is a well recognised fact that fibrosis does result from working in brass.

2272. And that the condition is produced by the occupation, and is not phthisis due to the ordinary chances which anyone is liable to?—Oh, no; I think it is a well-established fact that the inhalation of the particles produces fibroid phthisis, which is of course totally different from the ordinary tubercular phthisis.

2273. (*Professor Albutt.*) One very important point in regard to brass workers' disease is that copper is an essential, is not it?—Yes.

2274. Would you go as far as to call it copper poisoning, or do you think it is poisoning by an alloy?—I should be quite willing to call it copper poisoning if it could be proved that the zinc is harmless. You get very much the same symptoms in workers in copper.

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2275. Can you give the Committee any information about copper poisoning in other trades?—I have no experience of copper poisoning amongst those who work purely in copper.

2276. There are a large number of copper workers working, I suppose, in copper piping, and so on?—I suppose that is so.

2277. Have not you heard of any poisoning in those trades?—No, I have not come across any cases.

2278. Is it your opinion, when this disease does occur amongst brass workers that it is caused by the inhaling of the dust?—Yes, I think so.

2279. Swallowing it?—Probably swallowing it too.

2280. The poisoning to which you refer is not evidently pulmonary; its pulmonary symptoms are almost nil, are they not? The constitutional symptoms are far more important?—Yes, but a cough is a very common thing.

2281. If there is inhalation of dust and swallowing dust, one might expect a combination of constitutional and pulmonary symptoms, I suppose?—Yes.

2282. From the description generally given of this disease, it is the constitutional symptoms which appear, and these are attributable to dust-swallowing and the dust getting into the stomach?—Yes.

2283. There is not any agent more volatile than the dust itself?—I should think it was simply the dust; there are a number of other symptoms; of course I only mentioned the salient features, but there is the metallic taste in the mouth, the dryness in the throat—the laryngeal symptoms, which point to local irritation.

2284. The dust getting into the air passages, I suppose?—Yes.

2285. In this disease apparently there is no definite and preponderating sequence of symptoms?—No.

2286. Beyond becoming a little more vulnerable, the patient gets back to pretty much the condition in which he was before?—Yes.

2287. So that it is quite calculable what would happen?—Yes.

2288. Has any blood examination been made of these men?—I have not made any; I do not know if anybody else has.

2289. Are cases of this kind common? Do you think it is likely you could, or any of the witnesses could, find a case at the hospital?—If he has medical out-patients I should think he could.

2290. But they do not go into the wards so that blood examinations would be made. You said something about tremors. Are the tremors the mere shakiness of any debilitating cause, or are they characteristic?—I have never found anything characteristic about them.

2291. There is nothing special about the tremors?—I only meant to differentiate them from the shivering attacks in ague.

2292. Have you ever seen the hot and sweating stages?—I have not, and very few medical men have. These people do not take the trouble to go to a doctor. They simply go home, go to bed, and the next day they are well. But I have had descriptions quite vivid enough to accept what fell from some of these men, who have mentioned the sweating stage, and I have been very particular to inquire about it.

2293. And it would be very difficult, I suppose, at the time to differentiate it from an ordinary case of malaria?—Yes, I should think so.

2294. And as regards any ulterior consequences, it is negligible, I suppose?—Yes, I think so.

2295. I do not know that you can help us very much more about the fibroid phthisis matter. The death rate from consumption is very high, is it not, in Birmingham?—I believe it is; I cannot say what it is.

2296. And you cannot at all say whether you think that the brassworkers might contribute an important element to that high rate?—I could not say from any personal experience, but I remember Dr. Perry went into the matter some two years ago, and I feel certain he came to the conclusion that there was a distinct connection between brassworking and liability to phthisis.

2297. From your dispensary experience would you say that a large proportion of your cases of chronic phthisis were amongst brassworkers?—I should not.

2298. You think not?—No.

2299. Is your dispensary far from the districts where the brassworkers' industry is carried on, or do you think you receive a fair average of cases of this nature?—It has different branches, and I was at three of them.

2300. So that they would give a fair reflection of the disease, you think?—I think so.

2301. It has not struck you, then, that it is a very important element in the excess of the phthisis rate in Birmingham?—I do not think brassworking is any more important an element than any other debilitating work.

2302. I was referring to rather more than debility; I was referring to the injury done by particles of brass getting into the lung tissues?—Your point is, are brassworkers specially liable to contract phthisis? From the fibroid phthisis point of view I think they are.

2303. Is it then your opinion that workers in brass contribute any large proportion of cases of what we popularly called the phthisis death rate in Birmingham?—I do not think they would contribute very largely, though they might to some extent. I say so because in brass cases I have so very seldom seen either tubercular phthisis or fibroid phthisis.

2304. Do you know if in the museums here there is any important collection of lungs exhibiting such diseases?—I have never heard of any.

2305. You have told the Committee that you have visited these works yourself. In visiting them did you find coughs common amongst the workers?—Yes.

2306. Did there appear to be among them chronic cases of phthisis, using the word in the common sense, or do you think the men looked upon their occupation as a dangerous one?—No, I think not.

2307. (Dr. Legge.) You say you saw cases when you were at one of the dispensaries during three years?—Yes.

2308. Did you hear of the disease from your predecessor?—No.

2309. Or from your successor?—I heard of it from my successor.

2310. During that time, roughly, how many cases do you think you saw?—During the three years I was there I should think about 100.

2311. Then your predecessor would have had such cases, but his attention not being specially directed to the occupation, what would he describe them as?—I could not say. I should say debility.

2312. You said that the train of symptoms were as pronounced, in your opinion, as those of lead poisoning?—I think so.

2313. Taking the symptoms you have mentioned—anaemia, debility, nervousness, neuralgic pains, emaciation, tremors, cold sweating, greenish complexion, cough, and the green line—which of those would you consider were pathognomonic symptoms, or would you be able to distinguish them from neurasthenia? Would the mere association of a group of such symptoms produce a condition that you would be able to diagnose?—Yes.

2314. With regard to the green line, with the exception of the one instance where you say in the gland a trace of copper was found, have you any proof that the body becomes saturated with copper or brass, or that it is more than a mere local deposit of brass dust on the teeth?—You have green sweat.

2315. Is there any proof in green sweat other than that it is a local deposit of brass dust on the body which is brought out by the sweating? Have you seen green hair?—Yes, of course. Green hair might be accounted for by a deposit of dust on the hair.

2316. Has any test to your knowledge been made, beyond that one of the analysis of the bronchial gland, showing whether in the liver, or in the kidneys, or in the stomach, there is any trace of copper to be found?—No, I do not know of a case.

2317. Has urine ever been tested, do you know, for evidence of copper?—I do not know that it has.

2318. Supposing a medical man were to describe a

brassworker as suffering from neurasthenia, how could you say he was not suffering from neurasthenia, but from the effects of brass poisoning?—I do not know, except on the ground of common sense.

2319. That he was working in brass?—That he was working in brass and had the green line.

2320. (*Chairman.*) I suppose you are reduced to inference to a certain extent?—Yes, to a certain extent.

2321. It may be a strong one, but still it is an inference?—It is an inference; but the feeling I have about it is that when you have seen a few cases you get a distinct clinical picture which you cannot mistake for neurasthenia or anything else. I have frequently seen neurasthenia in brassworkers which I have not put down or made a note of as brass poisoning at all.

2322. It shows that there may be practical difficulties in the way of a diagnosis?—Yes.

2323. (*Professor Allbutt.*) Is the series of symptoms fairly uniform?—I think it is. A brass worker might be thought to be suffering from neuralgia, which might be thought nothing of, but when he comes to describe a condition which has been going on for weeks and months, and he has been becoming weaker and weaker, and he has this pallor, and cold sweating, and pains here and there, you get a picture which is quite distinct, I think.

2324. (*Dr. Legge.*) Supposing brass poisoning were included in the Third Schedule to the Workmen's Compensation Bill and the workman received compensation while he was absent from work, would there be risk, do you think, of a brass worker, who was suffering from some ordinary disease, coughing and so on, receiving compensation? Would the train of symptoms be so defined that a man could say, "This is brass poisoning, and the workman is entitled to compensation"?—I think he could.

2325. Can you say how long the disease takes to develop?—I can only say that it is extremely variable.

2326. Have you ever seen it developed in as short a time as a month?—No, I do not think I have.

2327. Do you think it is a question of susceptibility?—I think there is susceptibility.

2328. Have you any view as to the age of the workers who suffer most from the disease?—The young ones—the boys and girls.

2329. Under twenty years of age?—Yes, or thereabouts.

2330. With regard to brass founders' ague; in your description of the symptoms, you said that the workers went through a hot stage. Have you heard that from the workers themselves?—Yes.

2331. (*Professor Allbutt.*) Do you volunteer any evidence as to prevention?—Nothing definite except as to ventilation. I did suggest supplying the workmen with water acidulated with phosphoric acid, but I know it is difficult or almost impossible to supply these workmen with anything they would take.

2332. (*Chairman.*) But if they would drink a certain quantity of it, and were made to do it, would it distinctly relieve them?—I think it would.

2333. You are aware that under the Bill there is a provision that if a man deliberately neglects some precaution that is pointed out for saving him from the

disease, he may lose his compensation. If that is so, it would be a powerful incentive to the men to take and drink what was provided for them, would it not?—Yes.

2334. And this phosphorus solution would not be injurious otherwise to health, would it?—No, I do not think so. Of course, it is merely a suggestion which might not be a practical one.

2335. From a medical point of view, if we could make them drink it, do you think it would have a considerable effect in reducing the poisoning?—I think so.

2336. From the quickness with which it acts as an antidote, would it prevent the symptoms appearing in the case of the brass founders and brass workers?—That depends on the origin of brass founders' ague. If it was due to anything but copper, I should say probably not; it would probably have no effect on brassfounders' ague.

2337. But it would have an effect on the brassworkers, you think?—Yes, I think so.

2338. (*Dr. Legge.*) You wrote your paper in the year 1899, did you not?—Yes.

2339. At that time do you know whether the dust was removed from the polishing benches?—I think it was, in a desultory sort of way.

2340. Do you know now whether the exhaust system of ventilation has been applied generally or throughout the brass-polishing shops?—I have heard that that is so.

2341. Have you been able to associate any diminution in the disease with that?—I do not come across the disease now.

2342. Have you not heard it referred to?—I have heard it referred to by brasswork employers.

2343. How do they describe the state of the workmen's health now, as better or worse?—They always said it was good; they do not like to admit there is anything unhealthy about their work. I was talking the other evening to an employer, who considers it unhealthy work, and who is himself struck with the amount of brass poisoning, if I may call it so. He says there is extreme difficulty in working the ventilating apparatus, that the fans or exhausts do not work at all satisfactorily.

2344. Do you know whether he was referring to brass casting or brass polishing?—Brass polishing—we were talking about brass polishing—he also spoke of the impossibility of getting the men to take anything. He said that they were given water to drink, but they poured it out; they were given basins to wash in, but they never washed.

2345. (*Professor Allbutt.*) Thus we have to deal with three diseases—ague, brassworkers' disease, and fibroid phthisis. It seems that the diseases of which you speak can be distinguished under those three heads?—Yes.

2346. To go back to ague, do you say the cause is unknown?—Except that it is in the fumes.

2347. Brassworkers' poisoning is poisoning by copper, in your opinion, I understand?—Yes.

2348. But the fibroid phthisis is not specific, and would be comparable with the complaints resulting from any dusty occupation?—Yes.

MR. ROBERT M. SIMON, M.D., called in and examined.

2349. (*Chairman.*) Dr. Murray, the last witness, pointed out that there appeared to be two, if not three, particular different diseases that people working in brass might be subject to. The first he called the brassworkers' disease, due he thought to the absorption of brass dust into the system. Then there was a second disease which he thought was derived in some way from exposure to the fumes in brass founding, and then, but more hesitatingly, he thought that fibroid phthisis was in some way got by some of the men engaged in the brass trade. I should like to know whether that division accords with your view or whether you wish to correct it?—I do not understand your first division.

2350. Dr. Murray considered that the brassworkers, being men engaged in filing brass, were subject to poisoning by the absorption into the system of brass dust. Would that accord with your view?—I am not

aware of any symptoms which are associated with filing brass other than those which may arise from dust. The dust is exceedingly heavy, and it is much more likely to arise from the material used in turning and polishing brass.

2351. You may take it as though my question included turning, polishing, filing, and manipulating brass?—I do not think there are any specific symptoms associated with the use of brass as a material in that relation. I might emphasize that by saying that I think they are in exactly the same category with any other occupation in which there is much dust.

2352. Then you do not think that the absorption of dust from the brass is material?—I think it would be extremely difficult to absorb brass-dust.

2353. Do not you think there is any characteristic

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Mr. R. M. Simon, M.D. disease arising from the absorption of brass dust?—I do not.

29 Nov. 1906. 2354. Is there any phthisis caught by the inhalation of brass dust?—No, I think not. Perhaps I might very briefly state my views. I would say that there are certain symptoms associated with brass founding (of which I would like to speak later) in which there are copious fumes given off.

2355. (*Professor Allbutt.*) Do the same men work in the shops and in the foundry?—No. If I were to say definitely what I think, I can put it precisely in this way: brass founders are liable to symptoms from their occupation, and no other class of brassworker is liable to brass-founders' disease.

2356. (*Chairman.*) Does that finish what you have to say about brass-working as contrasted with brass-founding?—Quite so.

2357. Will you tell us in your own way what you have to say about brass-founding?—Perhaps you are aware that I was on a departmental committee some years ago which inquired into industrial diseases, and in that capacity visited the casting shops in different parts of England, especially those in Birmingham. We found the conditions in these brass-foundry shops or casting shops varied very much, but where the conditions were good and the fumes could be eliminated, there was little liability to what is erroneously, in my opinion, described as brass-founders' ague, and a diminished tendency to the occurrence of bronchitis from the irritation caused by the fumes of zinc, or from the deposit of zinc from cooling in the air. Where the conditions of work were good there was comparatively very little liability to bronchitis, and also, I believe, in a pathological sense, less liability to the occurrence of fibroid phthisis.

2358. What are the symptoms of the brass-founding disease? How would you describe the disease? Would you use the expression "brass-founders' ague"?—No.

2359. What would you prefer to call it?—I should say intoxication from zinc or the fumes of zinc.

2360. Would poisoning from the fumes of zinc be a better term than intoxication?—Poisoning. I will put it in this way: a man or a boy who has not worked previously in a brass-founding establishment goes into a badly-ventilated brass-casting shop, where there is a good deal of smother given off, and in consequence of that to some extent some of the fumes get into the stomach, or into the blood, and set up irritation of the stomach, and create nausea. I do not myself believe in the symptoms of the so-called ague, which I went into very thoroughly in an article many years ago. I do not believe that any of the symptoms justify the use of the term ague. The men simply get into an exhausted condition from not being accustomed to the fumes of zinc, but after a time they get more accustomed to it, and no longer feel the effects. I find, from a lot of investigations I made, that if a man was away from work for a month, say, on the first day he returned he would probably have an attack of what they are in the habit of calling brass-founders' ague, but that in two or three days' time he would cease to be liable to an occurrence of the kind. I found that if a man was introduced straight off into a brass foundry, after a day or two, or perhaps the first day, he would have an attack of brass-founders' ague; but he would become inured to it.

2361. What are the symptoms that he would have?—He would feel very ill, and very sick, but he would not have the sweating stage or the hot stage; he would simply feel the deadly discomfort a man feels before he is going to be sick. May I read you a description from an article which I wrote in the *Dangerous Trades* book? I said, "That Thackrah was in error in speaking of brass ague as an intermittent affection, occurring once a month or once a year, is clearly proved by the following positive observation, which is supported by all brassworkers. Ague never occurs among the regular workers, but always affects those who are new to the work, or who resume work after an absence of even a month or a fortnight. If a man resumes work—that is, melting or casting—after even so brief an interval, he is sure to have an attack of ague; but he will have only one attack, and remain free until after his next holiday. There is, most certainly, no kind of regular intermission, and, according to brassworkers themselves, they only suffer till they are inured to the poison. The following are the symptoms of this so-called ague:—After working

a few hours a man becomes languid, depressed, and feels very cold. He is very pale and almost in a state of collapse; his face is covered with a cold perspiration; he shivers, his teeth chatter, and he is restless and anxious. His head aches; there is much nausea, and complaint of muscular pains. As a rule, he goes or is led home, where he drinks freely of milk, and goes to bed. The symptoms continue until he has vomited, either as the result of taking an emetic or independently of it. Vomiting is usually followed by sleep, or recovery with more or less debility and lassitude on waking. Here is another passage in which I said: "Doctors Greenbow and Hagben (who are both unfortunately dead), speak of a more or less marked hot stage succeeding the cold, while, following the hot stage, they mention profuse sweating. The hot stage may be absent, but the sweating, according to these writers, invariably occurs. Our own observations, based on enquiry amongst those who have suffered from this ague, have never elicited a statement of these hot and sweating stages. Even direct questions as to their occurrence have always been met with positive negation, though some have spoken of free perspiration in the stage of collapse. How to reconcile these statements we do not know." Of course, one knows by experience that if one is very sick sweating is not uncommon.

2362. (*Dr. Legge.*) You say in what you have just read that the face is covered with a cold perspiration, do you not?—Yes, I think a man in a state of nausea may sweat a good deal.

2363. (*Professor Allbutt.*) And teeth chattering and shivering, and so on, is a colourable imitation of rigors, is it not?—Quite so. I am only quoting what has been told me. I have not observed these symptoms myself.

2364. (*Chairman.*) Do you see any green line on the gums?—On the teeth.

2365. Will you tell us what you know about the green line as an indication of brass poisoning?—I think it is an indication of copper.

2366. Have you seen the line on many occasions?—Yes.

2367. In what branches have you seen that?—Pretty well all.

2368. Have you seen it amongst brassworkers?—Yes; I am speaking, of course of brassworkers.

2369. Have you seen it amongst brassfounders, and also amongst the men who are engaged in filing and polishing brass?—Yes.

2370. Is not that green line indicative of a poisoning of some kind?—You see, it can be wiped off pretty well, though not altogether, because you get it in the hair.

2371. Taking the teeth first, if a person said I believe these men are poisoned, because they have a green line on the tartar of the teeth, what would be the answer to that?—If they had no tartar, I do not think they would have a green line.

2372. Then you do not think the green line is indicative of poison in the system?—Not in the system. I think it is an affection of the tartar from the more or less volatile copper.

2373. Except in the case of brassfounders, you do not think, I understand, there is a specific trade disease?—I do not; I am very emphatic about that.

2374. The National Society of Amalgamated Brass Workers are going to give evidence before us to the effect that the brass-casters are the most unhealthy members of the society. I gather that you would say that brass-casting, while making a man out of health for a day or so, would not make him the most unhealthy member of a society?—I think brass-casting carried out under ideal conditions need not be a source of danger.

2375. But, carried out under bad conditions, what do you say?—It would be so.

2376. Would you agree that it is likely that the brass-casters who have worked under bad conditions in early life are many of them dead, or suffering from premature old age?—Yes; I should say that brass-casters are generally unhealthy.

2377. Then is it your opinion that in a badly ventilated workshop brass-casting may do more than merely incapacitate a man for a day or two?—Yes; I should like to emphasise my answer. I say in my article, to

which I have already referred: "If more proof were wanting of the unhealthiness of brass-casters it would be afforded by the fact that a few years ago, though there were 1,200 casters in Birmingham, there were not more than ten over sixty years of age, and in connection with a superannuation fund of the Amalgamated Brass Workers' Association from which casters could, at the age of fifty-five, derive benefit, it is an appalling fact that there were only three men—two in Birmingham and one in Sheffield—enjoying this benefit." I think the reason is that owing to the exceedingly bad conditions which existed before the former Departmental Inquiry, and which I think still exist, brass shops were so exceptionally badly ventilated—there was no proper outlet to many of them, they being in cellars and underground places—that there was extreme liability to the continued prevalence of thick vapour and dust, in consequence of which tremendous irritation of the bronchial tubes resulted; and partly in consequence of the induced thirst many people became alcoholic, and rendered themselves liable to fibroid phthisis.

2378. Then, according to you, in the brass founding trade there are two effects of the poison; first there is the sickness and endeavour of the system to reject the poison, accompanied by the symptoms you have mentioned, and also, if the trade is persisted in, under very bad conditions, graver and different symptoms will supervene?—That is so.

2379. Will you tell us what those graver symptoms are?—Symptoms such as are associated with affection of the bronchial tubes, and consequent development of fibroid phthisis from the dust, caused by the bad ventilation and consequent inability of the fumes of the zinc to escape.

2380. But will the vapour of zinc produce phthisis?—No; bronchitis. The irritation of the bronchial tubes produces bronchitis. That bronchitis might become chronic, and may become associated with phthisis, and often is. There are two ways in which fibroid phthisis may develop in this connection, one is that the depression of general health renders the system more liable to the inroads of the bacillus, and the second is—and I am a confirmed believer in it—in the extension of the inflammatory process from the mucous membrane to the walls of the bronchial tubes and the fibroid charge extending into the pulmonary tissue.

2381. (*Professor Allbutt.*) What is your idea as to the prevalence of such fibrosis among hands engaged in a brass foundry?—I have not any views about it.

2382. Going into the shops, would you not observe any great prevalence?—No.

2383. Or from what you know of out-patients at an hospital?—I was for over thirteen years in charge of an outpatients' department, and in going through the shops I did not notice fibroid phthisis, but I noticed a large number of bronchitic people, and the statistics of the Friendly Society certainly bear that out.

2384. (*Chairman.*) But it is largely diminishing now, I understand?—I cannot say; I do not know.

2385. (*Professor Allbutt.*) The last witness spoke of ague as a thing arising, speaking generally, from fumes. Would you agree with that?—Yes.

2386. Then he specified entirely another disease, which he called brass workers' poisoning, or copper poisoning, and which was marked by a series of symptoms, such as anæmia, extreme debility, nervousness, neuralgic pains, and a green line on the teeth for which a cure could be brought about in a short time. Do you agree with that?—That is worth considering.

2387. Do you associate what we have called for the sake of a word, ague, with the other symptoms, namely, anæmia, and so on?—No, because I believe the ague is a purely intermittent affection, and not constant at all, and it could not possibly be responsible for the dreadful catalogue you mention.

2388. Do you agree with Dr. Murray when he said he thought the ague was an independent malady, and so unconnected with any other series of symptoms?—Yes.

2389. Is there a series of symptoms known as brass workers' poisoning which an expert could recognise as being characteristic?—I cannot conceive it possible that Dr. Murray could reconcile a statement of that kind

with a further statement that they would get well in a week or three weeks.

2390. Might I put it in another way? We can put the ague on one side as a temporary thing, cannot we?—That is my view.

2391. And we can put the fibroid phthisis as being a specific thing?—Quite. I am quite aware that an occasional case of serious nervous disease, neuritis, or other affection of the nerves, has been alleged to be due to brass poisoning, but I see a great number of cases of neuritis, and I certainly do not see an undue proportion of brass workers who are suffering from this condition. I have a case in hospital at the present moment of a man who is suffering from neuritis. The condition of the nerve trunks affects the arms and legs. He has been a brass caster for years, but he has been a tremendous drinker, and I have very little doubt that both the drink and the brass casting have predisposed him to the occurrence of phthisis, but that the drink alone is responsible for the neuritis.

2392. May I say you are of opinion that copper is not a danger?—I do not think so.

2393. We may exclude copper then?—That is my view. I have here a paper which I read before the Sanitary Institute on poisons in zinc, copper, brass, and tin, which I will put in if you would like it.

2394. I asked the previous witness whether any blood examinations had been made in these cases. You would scarcely know when to make them, would you?—No.

2395. Your evidence comes to this, does it not, that whereas the previous witness gave three classes (1) being the ague, (2) being the alleged series of symptoms due to copper, and (3) being fibroid phthisis, in your opinion there are but two, namely, the ague, which is a zinc poisoning, and the fibroid phthisis, which falls into the more general class of dust diseases, and is not in this sense specific?—That is my view. To put it definitely, if I do not see the green line upon the teeth, I know of no group of symptoms which would lead me to think I was dealing with a brass worker.

2396. (*Chairman.*) Phthisis is rather prevalent in Birmingham, is not it? The return shows rather formidable figures?—I am afraid I do not know it, but I ought to know what it is.

2397. Assuming for the moment that the figures show that phthisis is rather prevalent in Birmingham, would you put any share of that undue prevalence, assuming it to exist, down either to brass working or brass casting?—I can only say there are 600,000 inhabitants in Birmingham, and only 1,200 of them are casters.

2398. Then you think, do you, the number of casters in Birmingham is too small, on any hypothesis, to affect the result?—I think so, with a population of over half a million. The figure was 1,200 in 1888; there may be more now.

2399. (*Dr. Legge.*) Have you ever acted as pathologist at an infirmary?—Yes, for a short period.

2400. Have you seen many post-mortems on brass workers?—Yes.

2401. If you had two pairs of lungs, one of a Sheffield grinder, with the recognised form of fibrosis distributed in clumps about the surface, and also had the lungs of a brass polisher who had spent all his life in the polishing of brass, would you notice any difference between them?—I should not.

2402. Do you recognise fibrotic nodules distributed about the lungs as being characteristic of brass polishers who die in the infirmary here; do you get the characteristic of what is called stone mason's lung?—No.

2403. You said, I understand, that phthisis was secondary to bronchial disease?—Phthisis is much less common than bronchial disease. I consider a large number of cases of phthisis are due to the deterioration of health, when a person affords a suitable subject for attack.

2404. (*Professor Allbutt.*) There are two causes—the deterioration of health and the dust, are there not?—Certainly.

2405. (*Dr. Legge.*) In Sheffield we were told that there was such a thing as grinders' lung. Is there such a thing as brass workers' lung?—There may be, but I do not know it.

2406. You said that beyond the green line on the

Mr. R. M. Simon, M.D.
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Mr. R. M. Simon, M.D. teeth you recognise nothing that would point to specific illness in a brass worker of any kind?—No.

29 Nov. 1906. 2407. Do you recognise pallor in a brass founder—a greenish-yellow pallor?—No.

2408. If one walked into the out-patients' room, would you be able to tell if he was a brass caster?—No, I should say not; I should not have a ghost of a notion. May I say that I believe, in an ideal casting shop, there would be either no disease or very little disease.

2409. (*Professor Allbutt.*) By means of rules, how near the ideal could we get? Do you think we could practically eliminate the whole thing?—I think so.

2410. (*Chairman.*) You have been in casting shops yourself, and have seen them again and again, have you not?—Hundreds of them.

2411. Speaking generally, are you of opinion that, well regulated and enforced, special rules would tend to render the diseases non-existent?—Yes, I think so; and I think, further, if casting shops were licensed annually, the disease would almost disappear.

2412. (*Professor Allbutt.*) Do you think that in these

The Committee adjourned, and proceeded to inspect the works of Messrs. Evered and Co., Limited, at Smethwick, where the following evidence was taken.

Mr. EVERED, examined.

Mr. Evered. 2418. (*Chairman.*) There is an impression in some quarters, and in other quarters a broad assertion, that the brass trade is dangerous, and the particulars wherein it is regarded as dangerous are really twofold. In the first place, there is the brass casting, and then there is the brass working, in which the men are engaged in filing or polishing the brass, and in which brass dust is produced somehow or other?—What you mean I take it, is, not filing, but when the rough brass is taken off by emery wheels, and the grinding and polishing.

2419. There is that impression abroad, and the duty of the Committee is to enquire what diseases which especially result from industrial occupations are proper subjects for workmen's compensation. Can you give us any information upon the point?—In this particular case, you refer to brass dust, I presume?

2420. Yes, and to such fumes as are produced from casting, whatever these may be. The evidence is not enormously strong upon this specific trade disease, but unquestionably there is a certain impression amongst medical men that it is unhealthy in a great many workshops. I do not say in all shops, but particularly in those shops which are not well ventilated. Can you give the Committee any information in that direction?—You are now speaking principally with regard to casting, I presume?

2421. Yes. According to the evidence, the casters are the worse off, and the men engaged in casting come upon the funds of their unions more heavily than the men employed in other branches of the trade. They cannot give any reason for it, but they say they become ill, and they die. Have you any views upon the subject, and, if so, what are they? One way, of course, of meeting a case of the kind would be to enforce rules with regard to the removal of fumes and dust from brass factories; and another way would be considering the question, with a view of classifying it as a specific trade disease which should be the subject of workmen's compensation under the new Workmen's Compensation Bill, which is not yet an Act of Parliament?—What would you call a specific trade disease in this case?

2422. Brass or copper or zinc poisoning?—In its melted condition, or how?

2423. If it poisoned people somehow. The medical men would assist us as to the form it should take if it was a poison, and we should have to put it down under some name or other, which is a matter which would have to be considered. The question now is: Are those two things which I have mentioned dangerous? What is your view with regard to it?—I have had about 25 years' experience, and since I have read the proceedings in Parliament, and received the letter from the Home Office, I have really seriously tried to think whether I could remember any case of illness or disease which I could say occurred to an employee

rules there should be included any preventive drink, such as phosphoric acid?—I do not know why.

2413. In your opinion, it is not important?—The men drink milk sometimes, but more often they drink something else. I do not know whether the Committee have been to any of the Birmingham casting shops, but they are not so bad as some of those in Glasgow and Rotherham. I have seen some in Glasgow, and they are simply places in the cellars of six-storey houses, with no possibility whatever of the fumes escaping.

2414. Those were the places I was thinking of when I asked if you thought they ought to be licensed.—There I do not consider it is a healthy trade.

2415. Because of the conditions under which it is carried on?—Yes.

2416. But I suppose you would say that almost any trade, if it is carried on under exceedingly bad conditions, could be rendered unhealthy?—I am not prepared to go as far as to say that. You could eliminate all tendency to bronchitis by inhalation if you adopted the most perfect conditions; then I think it could be reduced to an innocuous minimum.

2417. You think then that the disease could practically be reduced to a minimum?—Yes, I do.

by reason of the conditions of his employment in our particular trade. We have between 1,000 and 1,400 people employed, a certain proportion of whom would be casters, and a very fair proportion of whom would be polishers, the only two branches of the trade as to which I think it can be suggested there is any risk to health. I take it there is no such suggestion with regard to any of the other processes dealing with brass, because if there is, I can show you the various conditions under which the work is done, and you can see for yourselves what they are. I may tell you that we have brass casters who have been with us longer than I have been connected with the firm, steady men, for whom I have a good deal of respect, and men who, I think, have hardly lost a day's work during the whole time.

2424. But the point is not quite that?—But I am taking men with long service in the particular trade, which I think is quite fair.

2425. If you will forgive me, the point is not that every man employed in the trade might be infected with the disease, but that probably only a limited number are susceptible, so that it is not of much importance to show that one particular man who has been engaged largely in the most dangerous part of the trade yet enjoys good health. That does not quite meet the point.—May I say that I do not quite agree with you, because my evidence, if it is worth anything at all, must be directed and must deal with those people who have been employed to my certain knowledge a long time in the particular trade, rather than to persons who have been only engaged in it a short time. I must look to people whom I have had for a long time in my employ, otherwise I can only give you hearsay evidence. I look at the old people as the best evidence on the point of disease, or no disease, in the brass trade. Some of our brass casters are men who have been with us perhaps only three or four years, but have come from somewhere else, where they have been engaged in the same occupation. I cannot tell you how long they have been brass casters, except from what I know of my own knowledge. I should not like it said for a moment that a brass caster is a man who is unsteady in his habits, or addicted to drink or anything of that sort, but I do find that you are more easily able to trace "illness or disease" to "St." Monday than to anything arising from the men's employment. I daresay you know what I mean by "St." Monday. I am on the best of terms with the people in my employment; but it is very difficult to tell what may be the habits of the people outside the works, and consequently whether any illnesses from which they suffer are attributable to anything arising during the course of their employment or outside.

2426. Granted that only a certain number of men

get the disease, when their cases were examined, do you think that their illness might be generally found to be due to other causes?—It might be attributable to other causes.

2427. Would you say that in many cases it might be attributed to intemperance?—No, I should not like to go as far as that. For instance, men stand out in all sorts of weather watching football matches and so on, and catch cold, with subsequent affection of the lungs, which might be put down to their being employed in the atmosphere of a casting shop.

2428. What would you say with regard to the ventilation of these shops, not your own necessarily, but the shops in Birmingham generally? I have been myself in a good many of them, and I think that the conditions in many of them leave a good deal to be desired in the way of removing dust?—Are you asking me about polishing shops, because I think we ought to keep polishing shops and casting shops distinct? There is practically no dust in a casting shop.

2429. There are fumes there, and I suppose that if a casting shop were not ventilated at all, you would not be surprised to find that the men employed in it were in an unhealthy condition?—They could not live if they had not any ventilation, no matter whether it was a casting shop in the brass trade or a shop in any other trade.

2430. I think there is a good deal yet to be done in the way of ventilation, both in casting shops and in shops generally, but how far can you speak upon the subject?—With regard to casting shops I think every casting shop would be practically ventilated—not theoretically ventilated, but that there should be louveres or something of that sort in every casting shop open to the air in the roof.

2431. Would you be prepared to say that it is possible to ventilate a casting shop efficiently without giving the men cold, and introducing an undue amount of cold air, unless you had some means of artificial ventilation in the shape of forced draught?—I do not think you would be able to get men to work under such conditions, and I do not think they could.

2432. But men can work with artificial ventilation, if it is properly carried out, can they not?—Then the place must be properly heated. It certainly would not do in the case of a man standing over the furnace, lifting a crucible out, to submit him to a blast of cold air suddenly.

2433. Do you think that there is no mode in which ventilation could be applied in the shape of fans without subjecting the men to too much cold?—I do not think an exhaust fan, for instance, is at all necessary, or the best way of ventilating a casting shop.

2434. What do you think is the best way?—I think it would be a bad thing to have a casting shop which has not a louver in the roof, or which has not some other means of allowing the fumes to escape as they do now from the top. A two storey casting shop is a very successful and healthy form of shop, but any casting shop is bad where there is no direct access to the open air somewhere in the roof.

2435. But you must have an inlet for air; must you not, otherwise the fumes will not escape, and the air in which the fumes are suspended cannot be replaced by fresh air?—Of course, there is an inlet for air, there is a door which is left open, and there are windows through which air comes, because they are nearly always broken.

2436. In such a case, would not an exhaust fan very much improve things?—No, I do not think so.

2437. But would there not be more air entering and more air removed?—You might get more draught.

2438. Supposing you had a Tobin ventilator, would not that be an improvement?—Tobin's ventilators would be no good at all. We are better than that already. Of course, I am speaking of casting shops which are built on anything like modern lines. There are some shops which are unfit for use.

2439. Do not you think that those old shops could be rendered fit by a properly arranged system of ventilation?—No, I do not think they could; I think the proper way to deal with them would be to condemn them altogether.

2440. Are there a large number of them in Bir-

mingham?—No; I should say there are very few of them compared to what there used to be. Of course, I can only speak from my own experience, because you can imagine that the last thing you would be able to do would be to have access to your opponents' foundries; but I should say that to-day the casting shop is built on the best possible lines, and I think I can show you that we build our shops on as good lines as you can have for getting rid of the fumes, which are only occasioned by the act of pouring the metal into the mould, which occurs at the most, six or eight times a day, and only lasts for a period of three to five minutes. It is not a continuous pouring, and a man generally puts a scarf round his mouth during the process, because he has to lean over the crucible when "pouring." No fan can take off the fumes to which he is subjected, because the man must of necessity have his head somewhere near the mouth of the crucible, and from the mouth of the crucible the fumes come.

2441. Still, from the mouth of the crucible a draught might drive the fumes away, I suppose?—The man has the casting mould put on edge in this fashion (illustrating); he has to set his knee against the mould; the crucible is placed in this position, and he has to pour the metal in. Therefore, of necessity, he has to look to see when the mould is full, and to have his head over it. I believe, in fact, if you had a gale of wind passing through a shop you could not take every fume away from the man's mouth. No amount of rapid current of air would do anything; in fact, the first thing it would do would be to so chill the brass that it would not pour.

2442. (Professor Allbutt.) Do you say that the men generally wear a handkerchief over their mouths?—Yes, when pouring.

2443. Does not that interfere with them in their work?—No.

2444. (Chairman.) Is that handkerchief for the purpose of avoiding the effect of the fumes?—Certainly. It is simply put there for two or three minutes while they are filling the moulds from the crucible, i.e., "pouring."

2445. (Professor Allbutt.) Can you give any description with regard to the effect which the men say the fumes have on them?—You can ask the men yourself, if you please. They say, as a rule, the fumes have no effect on them.

2446. Yet they wear a handkerchief?—Yes, to prevent any effect.

2447. The Committee are a little anxious to know what the special form of the disease from which they suffer is, and what is the cause of it?—I cannot find out. I frequently stand in a casting shop while the men are pouring out the metal, and I do not even take the trouble to put a handkerchief over my mouth.

2448. You do not know, then, exactly what the men are afraid of when they put the handkerchief over their mouths? Is it the so-called ague?—No; I should say it is done in order to prevent the disagreeable feeling of semi-suffocation. I may say that I generally expectorate when I come outside after I have been looking at pouring, and have not put a handkerchief over my mouth.

2449. (Chairman.) Do you get a taste of zinc in your mouth?—I am not sufficiently a chemist to know what the taste is.

2450. But I suppose you do get a metallic taste in your mouth?—Well, I do not say it is a pleasant taste, and if I were in a casting shop for an hour or more, and saw two or three pourings, I should probably put a handkerchief over my mouth. I believe there was an order at one time that the men engaged in the works should wear respirators, but they would not use them, preferring the handkerchief.

2451. Have you ever heard of an apparatus which has been put on the market by the firm of Rainsford and Lynes?—Yes. Rainsford and Lynes have been round the trade trying to get the apparatus used, because I suppose they were the patentees; but we did not find that the men appreciated the apparatus.

2452. But the question is, did it remove the fumes?—No, as far as I could see, it did not. The difficulty with regard to the use of it is that a man has to move the crucible about repeatedly, and he cannot

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see what he is doing if he is using the apparatus, and, to my mind, it puts a premium upon possible accident. Molten brass is not pleasant stuff to have spilt on one, and a man cannot readily move about a crucible if he has a cover over the top of it with a flexible tube attached so that he cannot see what he is doing. Therefore, I think the use of such a thing might lead to certain accident, sooner or later, which would be far worse than the conditions which at present prevail. I think, if you want to get at what is really the most dangerous, or was, perhaps, the most dangerous, part of the brass trade, it was the polishing as it used to be conducted, without any means of exhaust. I consider that was the most dangerous occupation, in consequence of the fluff which came from the calico mop which was used in the polishing.

2453. Do you think that there is some diminution in the danger attending the trade; and do you think that it is to be accounted for by the improvement in the conditions with regard to the use of exhaust fans?—Yes. I consider that every manufacturer in the polishing branch of the brass trade who is able to get over the difficulty by introducing exhaust fans should be rewarded.

2454. And, having done that, and comparing the condition at present with the condition in the olden days, do you think that what has been done has been to the benefit and has improved the health of the workmen?—Yes; I am a practical sort of person, and I look at the matter in this way—that there is a far less amount of dust lying about with the exhaust fans than there used to be before we used them.

2455. As a fact, is one able to say that the health of the men has really been improved. Is there any evidence as to that?—No. I can say from the very nature of the occupation, *i.e.*, polishing, I do not think you get the very best work people. Although there are plenty of decent and honourable polishers, it is not one of the nicest occupations, and therefore you do not get the highest class of men, women, or boys in it, and some of them are none too steady. The women—and there are a great many women employed in brass polishing—are not of a very high standard. Although, of course, I know nothing of their habits outside our works, I should think the ailments to which they are subject are acquired outside the works rather than inside. Of course, it is difficult to distinguish where illnesses are got from, but I should say that they are got more from outside than inside.

2456. (Professor Allbutt.) Are there any specific ailments to which the polishers are subject, which you can describe?—I have had women polishers engaged in our works for twenty years. They were so healthy that they used to be remarkably productive, and the only times they were away was when they had children born. It was about usual for these women to have a child every year, and if they had been unhealthy I should think they could not have been in such a prolific condition.

2457. (Chairman.) At all events may we take it as an outcome of the whole matter that you are in favour of ventilation with regard to the polishing shops, and with regard to casting you do not see any means of better ventilation; that you consider it a matter of the greatest difficulty, but that there are casting shops which, in your opinion, ought certainly to be abolished if they cannot be ventilated?—That is more a matter for the factory inspector. I have heard of casting shops which I think ought to be condemned, but that is only

hearsay, and you will get far better and more reliable evidence about them from the factory inspector.

2458. (Dr. Legge.) Among the thousand employees in this trade have you never had reason to suspect illness due to their work?—That is a big order to answer straight away, but if you will take it generally I can honestly say that I cannot call to mind a single case.

2459. (Chairman.) That is since the polishing shops have been thoroughly ventilated?—I may say at any time I cannot call to mind a certain case of illness arising out of the employment since I have been connected with this business, and that is since 1876.

2460. Then the reputation the brass trade has of being an unhealthy trade you think is not founded on fact?—The brass trade, as I know it, is not an unhealthy trade. Of course, we have people with us who have been thought to be unhealthy after very many years, but they principally suffer from *anno domini* when they leave.

2461. (Professor Allbutt.) Do you say that owing to the improvement with regard to better ventilation, better general conditions, and so on, that neither now nor at any time have you known of any specific disease due to brass working?—In my own personal knowledge I cannot say that I have.

2462. (Chairman.) There is a sickness, is there not, which new comers to the trade are liable to, and which they call ague?—I have never known in my personal recollection of a man having to leave his work during the day from ague.

2463. Have you never known of a case where a man has come for the first time in his life to the work being taken with sickness?—I should never employ a strange man.

2464. But men must first begin their employment at some time?—We never employ men strange to the trade. In fact, they all begin as lads.

2465. It is alleged that when men resume work after an interval, and when they begin work for the first time in a casting shop, they get an illness which produces vomiting and pallor, that they have to go home and sleep it off, but that it rarely lasts beyond a certain number of hours?—I do not know of those cases. I know that the same symptoms might be produced from "other" causes, especially if a man has been away for a week. I could quite understand a man might be sick when he came back then.

2466. But still you say they do not vomit, do you? Absolute vomiting has been alleged by other witnesses.—I do not know of it.

2467. (Professor Allbutt.) A far more important allegation is that there is chronic phthisis from the inhalation of the copper constituent of the brass. For instance, in casting molten metal it is said that there are fairly characteristic symptoms, curable but lasting over some weeks, which are marked by extreme debility and emaciation, and that anæmia is one of the permanent features?—I have no entrée, of course, to all the shops in the trade, and I can only speak for my own, and having mixed a great deal with my men generally, I can speak from my own personal knowledge with regard to them. I cannot speak with regard to the conditions under which they live, except in my own factory, and I do not know of such cases.

2468. Supposing that all the shops in the trade were worked under such conditions as yours, do you think that you would find this disease?—You may look at the people themselves at work, and then you can judge for yourselves.

NINTH DAY.

Friday, 30th November 1906.

MEMBERS PRESENT.

MR. HENRY CUNYNGHAME, C.B. (*Chairman*).

PROFESSOR CLIFFORD ALLBUTT, F.R.S.

MR. T. M. LEGGE, M.D.

MR. T. E. BETTANY (*Acting Secretary*).

MR. W. J. DAVIS, called in and examined.

2469. (*Chairman*.) You are Secretary of the National Society of Amalgamated Brass Workers and Metal Mechanics, are you not?—Yes, the General Secretary.

2470. Have you acted in that capacity for several years?—From 1872 with an interregnum, when I held a factory inspectorship from 1883 to 1889.

2471. How many members does that society consist of?—7,000.

2472. What branches of trade are represented by your society?—Chandeliers, general gas fittings, and electric lighting fittings, which is all one department. The next branch we put in order is the plumbers' brass foundry and steam fittings branch; the third branch is the cabinet brass foundry, which deals with articles with no insides. For instance, in steam and gas fittings there is an inside, gas or water tight, but the cabinet branch is more external and ornamental, such as door knobs, handles, hinges, cabin hooks, and a variety of things that come under the category.

2473. Is there not also a brass finishing branch?—Yes, it is a general term, and finishing should be included in that class. Then branch 4 comprises bedstead mounts. These brass bedsteads are all hollow. We do the mounts and the bedstead trade do the iron work—the cupola work. We stamp and finish them.

2474. Where do the button makers and stampers come in?—That branch would be included in the bedstead mounts. It should be bedstead mounts, ornamental stamping, including buttons, and everything that comes into metallic ornamental work.

2475. Where would curtain poles come in?—Under the ordinary cabinet brass foundry, nails, and all sorts of fittings. Then the next division would be copper workers, not furnace copper work, but kettles, pans, shovels, and scoops, and domestic copper work of all sorts. Then there are the brass and copper tube and wire trades. There is the solid-drawn tube, which is one distinct department, and then there are the cased tubes and braised tubes.

2476. The solid tubes are generally copper, I suppose?—The solid tubes are generally cast, and drawn from the cast, copper and brass as well. Boiler tubes are solid, and this branch includes the pouring and mixing of metals.

2477. Are there a certain number of men engaged in these foundries who are called brass founders?—All of them are casters except the stampers.

2478. There are different men engaged in founding, of course?—I think you had better take the classification of the work. There is first the pattern-maker. I will give the processes: pattern-making, chasing, casting, finishing, burnishing, polishing and putting together.

2479. So that there are six processes, are there, in the trade?—Yes. Of course, they could be still further sub-divided, but that is the general way of taking it.

2480. May I take it that you have come to tell us that there is a certain amount of disease contracted by the men engaged in this work?—Yes, by the putters-together, polishers, and by the casters, but we have only made a specific application with regard to the casters. We want to concentrate our evidence on that class. We could say as much for the polishers almost as for the casters, but we have dealt with casters only.

2481. Of the 7,000 men who are distributed among the six branches you have mentioned, can you tell approximately how many are engaged in casting?—2,000 altogether.

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2482. You speak for those 7,000 men?—Yes.

2483. But I suppose there are a certain number of them who are outside your society?—Yes, I represent more, because I represent also the tube workers, which is a separate branch under the same roof.

2484. But you represent, as I understand, 2,000 casters?—Yes.

2485. How many more casters are there in Birmingham that are not represented by you. What would the total number be?—I should say about 300.

2486. Then you very nearly represent the whole trade, do you?—Yes, as far as Birmingham is concerned.

2487. Do the 2,000 casters all belong to a benefit society. Is the society you represent a trade union pure and simple, or are there benefits attached to it?—The benefits are strike pay, out-of-work pay, sick pay, superannuation, and general benefits.

2488. Out of your 2,000 men, how many get the benefits of the sick pay, the superannuation, and the general benefit—the whole 2,000?—Yes.

2489. Can you give an idea roughly how much they contribute to that fund, and what benefits they get?—The brass casters trouble us most, that is to say, they are on the funds more frequently.

2490. I want to know the relative figures—what do they cost you in figures?—About 20 per cent. of the casters declare on the funds each year.

2491. Forsick pay, superannuation, or funeral benefits?—Yes, under one of those three heads.

2492. Can you give an idea of the amount to which they come on the funds?—As we have various sections, that is difficult to say. One is entitled to 5s. a week, and another 11s. Some of the superannuated members are entitled to 5s., some to 6s., and some to 7s. per week.

2493. How many pattern makers come upon the funds of your society?—About one per cent.

2494. And chasers?—About one per cent; they are both healthy trades.

2495. And finishers?—About five per cent.

2496. Then burnishing and polishing?—You must put the burnishers first; it is a healthier trade than the polishers. Burnishers I should say five per cent.

2497. And polishers?—Quite fifteen per cent.

2498. And the putters-together?—That is a very unhealthy trade; there is white lead used in that. I should say twenty-five per cent. The parts are put together with white lead, and the men have to test the work by suction with the mouth, and the white lead gets into their systems.

2499. Will you describe as well as you can the symptoms to which brass casters are subject, and state to what you attribute them?—The process of brass casting is this: there is a furnace into which is put a pot, called a casting-pot, or a large crucible, in which the metal is melted, and when it is in a molten condition and

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ready for pouring, the operation of pouring is very heavy. To stand the fires a man has to be of herculean strength and there is such a smother in the place that one can hardly see the man who is doing the pouring. He is practically invisible, and one of the witnesses, I think, will be able to show you a photograph of the operation. You can see the process of pouring, but the difficulty is to find the man. It is these fumes getting into the system and on to the lungs makes them so ill. They die very young. The very strongest of them may live to be 60 years of age sometimes, but not at casting work. They have to retire before then, and I do not think you could find out of the 2,000 casters six of them who are at work at 60 years of age.

2500. What number of men would be at work at 60 years of age in the other branches of the trade?—The finishing is a very healthy trade and there would be, I should say, as many of that age employed as in any other part of the community.

2501. What would you put it at as a percentage?—I should say about 20 per cent. above the age of 60.

2502. In the healthier trades do you mean there would be 20 per cent. employed over 60 years of age, and in the casting trade there would not be 1 per cent.?—Yes, six out of 2,000 would not be 1 per cent.

2503. I suppose the conditions were much worse in past years than they are now?—Much worse.

2504. Do you think that the operation of the various Acts which have been passed have conduced to any improvement in the conditions?—Yes, I was a member of the Departmental Committee which sat in 1896, and I think there is no doubt that legislation has considerably improved the condition of the shops.

2505. Would you say that improved education, or at all events the improved wisdom of the workmen, has improved the conditions of life under which they live and that they take more care of themselves than they used to?—The improved sanitary arrangements everywhere have helped them, but, of course it has helped the other part of the community as well.

2506. I quite agree; but do you think the fact that there are very few old men in the trade is partly due to past conditions?—That holds in all trades except casting and polishing. It does not hold in casting because you may improve the conditions, but the deadly nature of the operation knocks a man down suddenly. You can improve it as much as you like, but there are some constitutions that cannot stand it as well as others. We have been largely helped by regulations from your department certainly.

2507. And I suppose by the improved intelligence of the worker?—Yes, quite so.

2508. Would you say that that was true as an authority on the question?—That is absolutely true, and you might include increased sobriety.

2509. There is less of the taproom about the trade than there used to be in years gone by, is there?—Yes.

2510. What are the symptoms of the complaint from which the men suffer?—The men call it brassworkers' ague, but the doctors differ.

2511. What are the symptoms that supervene. I do not know whether you have ever worked in a shop?—Not at brass casting. I am a finisher and maker of chandeliers.

2512. Are you able to speak from personal experience?—I think other witnesses had better give the symptoms, but I can do so. The symptoms are that the man feels shivery when the first attack comes on, and begins to tremble. Then he goes home, and perhaps on the way he thinks he wants some beer or something. The dust is down him, and if he is unwise he will have some beer, which will make him worse. He goes home and someone says, "Oh, you want to sweat that out." He goes to bed and does sweat. The next morning he gets up still weaker. If it is an acute attack he will begin to cough very much, and if he does not very much improve he will have to keep in bed; he cannot keep up at all. Then the doctor is called in, and gives him something to relieve him, and he may return to work if it is a mild attack in a few days. If it is a bad case it may last him his life, so far as being able to work is concerned. Sometimes in extreme cases they never get over it, but if it is a mild case the man returns to work. The second attack is still more severe, and after the third attack he becomes almost paralysed.

2513. Have you a certain number of men who are in the condition of this third attack, who can be shown and seen?—Yes.

2514. Are those men actually working now?—No; they are either on our superannuation fund or in receipt of sick pay. Finishers cannot come on the fund until they are 60 years of age, but brass casters can at 55; and at 55 they seldom receive the benefit because they die younger.

2515. But have you a certain number of men whom you would say are in the third stage?—Yes, the last stage. I will produce the actual men.

2516. And do you put that down to the fumes of the casting?—Yes.

2517. If means could be adopted to remove those fumes, could the trade be rendered harmless? By proper arrangements as to ventilation, do you think it would be practically impossible for the fumes to get to the men?—There is an apparatus which takes a good deal of the fumes away from the men, but I question whether it will ever be a healthy trade under any circumstances.

2518. Could you furnish the details of the 20 per cent. of the men you have mentioned as coming on the funds in the form of a table, man by man?—Yes.

2519. I assume you do not ascribe to this disease the whole 20 per cent. that have come upon your funds; there will be the usual proportion amongst them who are ill from other causes?—Yes, there would be about five per cent., that is to say, to put them on the same footing as finishers.

2520. I am surprised rather at the small figures with regard to pattern-makers, because one per cent. seems to be a small number to go upon the funds yearly?—There is not one per cent.

2521. So that many of the men go through their lives, if they are healthy, without ever coming on your funds at all?—Yes, many of them. Many of them die without ever having had any benefit from the Union.

2522. The Union put them on the funds, I suppose after discussion before a committee and hearing what the doctors say?—No, it is simply a declaring note from a doctor; a certificate from a surgeon.

2523. You act entirely on the doctor's certificate, do you, without any enquiry?—Yes, unless we had a complaint that a man was malingering; then there would be an enquiry before a committee. Otherwise, the procedure is automatic.

2524. Have you any theory as to what metal it is that causes this disease?—The zinc. The yellower the metal the more deadly the poison.

2525. The yellowness of brass is, to a certain extent caused by the lead in it, is it not?—Yes.

2526. Would there be five per cent. of lead, and even more, in some cases?—Yes.

2527. Is not it probable that a certain number of these cases are really lead poisoning?—Yes, I should say it is probable; but zinc oxide is the deadly thing.

2527*. Can you give the Committee any idea of the proportions of zinc to those of lead contained in the metal which these men use?—It varies. Metals may contain 17 per cent. of zinc or much more.

2528. Can you give the proportion of men who are poisoned by lead as compared with zinc? Do your doctors report on the difference between lead and zinc poisoning?—No, I should say that a third of the cases only could be accounted for by poisoning from lead.

2529. And there still remain two-thirds from zinc?—Yes.

2530. Do you know what treatment doctors give them generally?—No; I must refer you to the doctors for that.

2531. One or two of the medical men who have been before the Committee stated that they do not think very much of brass founders' ague. What they say is that it is a thing that attacks men particularly when they come fresh to the work either for the first time in their lives or after a cessation of the work for some time, that they get vomiting and sickness and an uncomfortable feeling, or more than an uncomfortable feeling; that they go home and sweat it off, but that in a day or two they are quite right, and that the aggravated cases do not last more than two weeks or three weeks, or at the most four weeks, and that permanent disability from it does not occur within their knowledge. What do you say to that?—I say the doctors are wrong. The

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young and strong may have just a little bit of sickness and vomiting, as you say, but they are very strong and healthy men it may be, till they are 26, 28, 30, 35, or 40 years of age, but then they collapse, and are unfit for work in any foundry. It is in their prime that they suffer most.

2532. Can you give of the twenty per cent. you have mentioned the proportions that are receiving different forms of relief. I want an idea of the proportion of men who are permanently or partially disabled, or to a small degree disabled. Can you furnish a table showing that?—Yes, I think I could supply a useful table. It would take a little time to do it, because there are so many men coming off and on in sick cases.

2533. Can you give the figures, drawn actually from your books, of the number of men you have on the books for a week or for two or three days?—They cannot be on for less than a week, and I should have to get out the days to complete the figures.

2534. Will you let the Committee know how many were on the books for a week, a fortnight, or three weeks, how many were getting superannuation pay, and in how many cases funeral expenses were paid?—Yes, I may say that out of 106 men who are on our superannuation fund there are but eight casters and yet we put them on at 55 years of age instead of 60.

2535. How many of all the other branches of the trade are there. You have eight out of a body of 2,000 casters; how many men out of the remaining 5,000 have you on the superannuation fund?—We have 106 altogether on the funds; so that that would leave 98 men of other trades out of 5,000, and only eight out of 2,000, on the superannuation fund.

2536. (*Professor Allbutt.*) In the description of the symptoms you have given us you seem to me to have mixed up two or three forms of disease. What medical men tell us is that we have to distinguish the ague from the more chronic poisoning?—Yes.

2537. That the ague is a sort of acute poisoning which does not run on into the other form. If you disagree, of course you will say so as an observer, but one or two employers, or managers, to whom we spoke, are of the opinion that ague is an indisposition which comes on when a man either first commences the work or returns to it after an absence, but that, after a while, he gets a certain immunity from it apparently with no further damage to his constitution?—He gets injured.

2538. Do I understand that you are not dealing with brass-workers generally?—For my present purposes I am not considering them. We are dealing with the deadliest trade from our point of view.

2539. Then you would have to take it, I think, that the medical men allege that from brass casting only two consequences arise; first of all the ague to which the men get injured, and which does not ultimately harm them, and secondly, the pulmonary affections which may arise from the inhalation of particles. Do you think your chronic invalids have fallen ill from pulmonary disease?—Yes, brought about by what they call the smother.

2540. Would you say that bronchitis was the cause of your men becoming disabled?—Yes.

2541. It is rather through their lungs that they suffer?—Yes.

2542. So that if you found reason to regard the ague as a temporary thing, your attention would be centred rather upon the pulmonary form of disease, would it not?—Yes.

2543. Do you attribute the disease to zinc, but not so much to zinc poisoning as to its direct action as an irritant to the lungs?—The men suffer in a variety of ways. I could not give a definite negative or affirmative reason.

2544. Do you think these men die young?—The great majority die under 55, or even under 50.

2545. The work is a work involving very hard labour is it not?—Yes, very.

2546. Apart from the poison in any articles used in the trade it involves excessive muscular labour, such as the work of puddlers, who are not exposed to poisonous fumes, and would you not say that the same effects might appear in them?—I do not think that follows. I think in addition to the effects of the zinc and lead we have men working quite as hard as they do. Turning at the lathe by foot, as we used to, is much harder work than the present brass casting. Those men were healthy men, and were never attacked

by these sort of things at all. So that I do not think it is the excessive labour which affects them. Of course, to stand at a fire and mould is heavy work, but it is not the heaviest work in the trade.

2547. The Committee saw one man actually engaged in casting yesterday, and he seemed a little Hercules, an exceedingly powerful, short man, and I should think he was a fairish age—a man of 50 he certainly had grey hair. It struck me as being a very laborious employment, and he was bathed in perspiration?—Probably he was strip casting, which is a very different thing; it is more laborious. That is the most laborious part of the work. That is pouring, not what we call casting; it is pouring into ingots the metal for the other casters.

2548. Then that is not the class of man who breaks down first, is it?—The class of men you speak of break down as often as the others from the effects of the sulphur in the mixing and so on.

2549. You see the Committee has to try to distinguish between the effects of heavy and continuous muscular exertion and the effects of particular poisons used in trades. Do you not find that in all laborious occupations diseases principally of the heart are prevalent?—I did not know it.

2550. That is the case in all laborious occupations combined with a certain amount of drink?—Quite so, but I think you will admit that there is in iron casting quite as laborious work as in brass work, but they do not suffer as brass workers do.

2551. My opinion is very much to the contrary. Ironworkers—of whom I know a good deal, having been physician to the infirmary at Leeds for many years—do suffer?—I am sorry for them, but I have always understood, and my experience as a factory inspector was, that ironworkers were much healthier.

2552. They break down with regard to the heart and the blood vessels if engaged in the laborious part of the work. Have such men as you are going to produce before the Committee been regularly submitted to your medical man for examination?—We have not a medical man in that sense. These men are generally in a sick society; the doctor takes them at so much per 1,000 and gives them medicine. They cannot always be inquiring why such and such an illness has arisen.

2553. The Chairman has indicated to you what the medical men say, that this is ague. Then as to chronic poisoning, the medical men who spoke most strongly about it said that three weeks' medical treatment would get them well again, what do you say as to that?—Did they tell you why they died so young?

2554. (*Chairman.*) I think all that emphasises the necessity of your giving us the best figures you can. Figures are very eloquent things if they are correct, and the Committee would like the very best figures and the best details you can give—and I am sure they will be honestly given—as to the branches of this trade, and the different numbers of men you have on the books, particularly specifying the different amounts paid to them, and the weeks and months they are on the funds, not only doing it with regard to casters, but with regard to the other branches, so that we can institute a comparison between the trades.

2554a. (*Professor Allbutt.*) With regard to improvement in sanitation and the improved character of the workmen, there is no doubt about that, is there?—No.

2555. I have been struck, and I suppose you have been struck in visiting works, to find the very great differences there are in the sanitary conditions of the buildings?—Yes.

2556. Some seem very much neglected and rough, and others seem to be kept comparatively tidy?—Quite so.

2557. Without going into very complicated details would you say, on the whole, the cleaner and purer a place is kept, the less sickness there would be?—The cleaner and tidier a workplace is kept, including the workmen, the better for everybody.

2558. Do not you think a very great deal might be done in the way of keeping shops much cleaner than they are?—Yes.

2559. Do you think it is compatible with the duties which people have to perform in them that the whole of the places might be kept very, very much cleaner than the cleanest of them now are?—They could be very much improved.

2560. (*Chairman.*) Taking the men who are on the sick list, can you form an opinion as to whether the

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larger or disproportionate number of them come from certain foundries which are known to be bad foundries. There are known to be bad foundries and good foundries in the trade, I suppose?—Yes, there are, but I do not think we could discriminate. I think the sickness they suffer from will occur at the least unexpected place.

2561. Is it not the fact—and a fact known perfectly to your men—that there are good foundries and bad foundries, places where they are much more likely to get ill than at others?—I do not want to say the case cannot happen where there is ventilation and cleanliness. We do not get so much illness from some of the best foundries, but I do not know that there is a foundry free from it.

2562. It would be rather important if you could furnish us with the names of the foundries the men have been working at. We will not publish it, but I think it will be very important if you can let us have it?—I will do what I can with regard to that.

2563. Could you give us the names of the firms, because I should much like to see them?—I will give you all the information I can.

2564. Your case is so largely a statistical one, that we must have the best possible figures if we can get them, so as to make the case as full and as clear as possible. Professor Allbutt suggests that you should give the Committee some information as to the Rainsford and Lynes patent apparatus. Can you do so?—I gave a lecture on the subject at the technical institute here. I think it is a very good arrangement, and it only costs some £6 or £7 to put in, but that is the great obstacle with the manufacturers. They spend nothing if they can help it.

2565. It is also alleged that in many places the men will not use them. They say they get in the way, and that they cannot see to pour; do you know anything about that?—That is the excuse the manufacturers make.

2566. You do not think the men say that?—Generally speaking, no. There may be a stupid man here and there amongst the casters who will not use the thing.

2567. But your view is, is it, that the men like them?—Yes; in fact, they should be made to like them if they do not, because with them you can minimise the danger.

2568. I suppose the owner of this patent is not charging exorbitant terms for it, is he?—Oh dear no; it is a few pounds, that is all.

2569. I meant exorbitant terms for the patent rights.—Oh no; I think he would be pleased to give it to the public if he could see it generally adopted. He is in the trade, and he is a man of that kind.

2570. You think he would be content with a very small royalty, do you?—Yes, his desire is to see that, or something like it, used.

2571. Who is the inventor?—Mr. Lynes, of Rainsford and Lynes, of Emily Street, Birmingham.

2572. They are not people relying on this patent for a livelihood, but have a large business, have they?—They have a large business; they employ 100 of our members.

2573. Do they employ this thing, then, in their own works regularly?—Yes. I should think they would show you both processes, the old and the new.

2574. Even with this thing apparently there must be a little of the fumes coming out?—Yes, I should think about 15 per cent. as against 80 per cent without it.

2575. Is your lecture printed?—Yes, just a synopsis of it. I can send you a copy of it.

2576. (*Dr. Legge.*) With regard to the figures which you are going to supply, do I understand that sick pay is given on a doctor's certificate?—Yes.

2577. You personally, I suppose, see all these medical certificates?—Either my cashier, or a clerk, or myself.

2578. Do you file them and keep them?—No. We keep them perhaps for twelve months, but not longer.

2579. Can you let the Committee see the certificates?—Yes.

2580. Have you ever seen brass poisoning mentioned on one of these certificates?—No.

2581. Brass poisoning is not a term which is recognised, is it?—No, they would not put brass poisoning on.

2582. Have you found ague or brassworkers' fever, or anything of the sort on them?—No, the doctors generally give the men a certificate that they are unable to work.

2583. Do they not mention the particular disease?—No, they do not mention the particular disease.

2584. Cannot you require that they should mention the particular disease?—No, because we do not pay the doctors. Our declaration notes would be of no use to you; it would simply be that Thomas Jones is ill and unable to follow his employment.

2585. If you published in your annual report an analysis of the diseases for which you allow sick pay, it would help us very much, would it not?—Yes; and we should have done so if we had known this inquiry was coming on. The Compensation Bill came along, the dangerous trades question cropped up, but we did not know of it, or I am sure I should have prepared the statistics.

2586. So that it is merely your own opinion, is it, that these brass workers are so incapacitated late in life. I mean you have no doctor's evidence?—My opinion, based upon a large experience, you know.

2587. You said, I think, when a man has an attack of ague he sends for the doctor. Is it a fact that they do send for the doctor?—Yes.

2588. My impression always has been that the symptoms were very slight and evanescent, and the recovery was so rapid in 90 per cent. of the cases that they did not send for a medical man?—Yes, but I was dealing with the acute cases. I said the first attack was a mild one; the second was worse; but when the acute stage came on they had to send for a doctor. Sometimes they are not in a sick club and go on without a doctor, but if they are in a sick club they can send for a doctor, which costs them nothing. Then they do.

2589. Do you know of cases where men get an attack of this every week—every Monday after they return to the casting shop?—Yes, I have known of cases where, being absent from the Saturday afternoon to the Monday, the strength of the fumes is too much for them on the Monday, but they only get a slight attack of it, and get injured to it; they go on that week and get another, and similar attacks the following weeks.

2590. Those attacks week by week can hardly be cumulative in the sense that you refer to, can they?—No, not in that sense. It would be arising from a weak constitution perhaps, and a man might be very careful and sustain them for a time. They are very subject to them right up to the end, and the men who suffer first and suffer frequently are the men who die soonest. There is one statement I wish to make. During my experience as Her Majesty's Inspector of Factories in Yorkshire and in Derbyshire, where there are white lead works, I never saw anything like the amount of sickness and abstention from work, in consequence of the process of the work, as I have seen in the brass trade, that is to say, in brass casting.

2591. (*Professor Allbutt.*) There is a little difference between more frequent and more permanent, is there not?—I should say the brass casting is more permanent. I have seen whiter faces in white lead works.

2592. My experience of white lead works in the Potteries and elsewhere is that the people have whiter faces than those engaged in the brass trade.—I cannot speak of the Potteries, but I can speak of the white lead works, as such, in Derbyshire and Yorkshire.

2593. (*Chairman.*) Your case must be, must it not, that while the trade, taken as a whole, is not alleged by you to be an unhealthy trade, certain branches of it do present conditions of abnormal unhealthiness?—Yes, especially the casting.

2594. And you will be able to produce some figures with regard to that, will you?—Yes.

Mr. ISAAC BRADLEY, called in and examined.

Mr. I. Bradley.
2595. (*Chairman.*) Have you been Coroner for Birmingham since April, 1897?—Yes; and I have had a knowledge of the brass trade, unofficially, all my life, because I have lived here all my life, and my father was in the brass trade.

2596. The brass trade may be, for our purposes, roughly divided into two processes, namely, the founding or casting of brass and the various processes of finishing and polishing. Do you understand them both?—Yes, I understand them both.

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2597. The case made to the Committee is that it is particularly in the casting and founding of brass that disease is likely to occur, and if you please we will take your views on that point first. Do you agree that there is a difference between the two?—I think there is a decided difference between the two.

2598. Will you state your view as to how far the founding or casting of brass is a dangerous occupation?—I have never had any evidence, as a coroner, of that. I have never had any case of death from brass casting, which has been attributed to the trade in any way at all. My father was a caster; he was a small master, and I was brought up in the middle of it. He himself had chronic bronchitis. I do not know that it was brought on by his trade. I never heard it said, but almost all the time I knew him he was a chronic bronchitic, and used to keep out of the way when they were pouring metal and fumes were arising.

2599. He considered it dangerous to him, did he?—Yes. Of course it irritated his breathing passages, but I have seen him pour metal himself on an emergency, and when he was going to do it he would tie up his mouth with a big handkerchief. I have never known any death arise from casting, and have never had it suggested to me.

2600. I suppose the deaths might occur from that cause without its being brought before you. Men quietly dying in hospital would not be the subjects of an inquest, would they?—No, but I think I should probably have heard of it if the doctor had any notion that it was due to some practical trade process. I might not have heard of it in every case if there were many, but in Birmingham the medical men are, if I may say so, in very happy relation with me, and in almost every doubtful case, or a case which they think is worth enquiring into, the habit of the profession in Birmingham, I am glad to say, is to report it to me, and give me a chance at any rate of saying whether I want to go into it further or not. I quite understand that a man might say, "This is a natural death and I can certify," so that the Coroner would not hear of it; but I think it is probable I should have heard of it if there had been many cases.

2601. (*Professor Allbutt.*) It would be rather cases of acute disease, would it not, that would come before you?—I do not know about that.

2602. Would a chronic case lasting over some years some under your notice?—Not necessarily, but practically it would depend on the particular view the doctor took.

2603. (*Chairman.*) Apart from the question of death, would you say the founding and casting of brass was a trade likely to give people pneumonia, for instance, or phthisis, or bronchitis, or something of that kind?—Only in the sense that any occupation may become dangerous. I will take the first illustration that occurs to me. You might say an engine-driver on a locomotive was apart from the ordinary dangers of a railway, specially liable to take pneumonia because he is working with his fire on one side of him and a keen wind on the other side of him. It is only dangerous, I should judge, in that remote sense. The regulations which were made a few years ago as to casting shops, I should think, did all that could be done.

2604. How would you account for the fact that the secretary of a large workmen's trade union here says that the number of men who are engaged in casting and founding who come upon the funds is abnormally large, while on the other hand the superannuation amount is abnormally small; very abnormally large in one case and very abnormally small in the other. While he does not represent the whole trade as an unhealthy trade, he says that that branch of it comes upon the funds in such a striking way that it can leave no inference but that founding and casting is unhealthy. What should you say as to that?—Of course, I should not attempt to contradict any considered opinion of Mr. Davis.

2605. But would it surprise you to find that?—Yes, it does; I should not have expected that. Of course, as a side issue—I do not want to run away from an answer—casters are as a class rather intemperate and they do not take care of themselves.

2606. In the same way that the other members of the trade do?—They are particularly, I should say, people who drink a good deal. They are in shops where there are furnaces, and my experience is that they drink a good deal more than they should.

2607. And there is, in addition, the cold blast of air and the heat?—I do not think that is worse than in

thousands of other shops. My eldest brother was brought up to my father's business: he is alive and he is 66, and has never suffered from bronchitis as my father did.

2608. He was not engaged in actual casting himself, was he?—Yes, he was for a great number of years. He has experimented a good deal of late years with all sorts of metal, and has been doing a good deal of actual casting lately.

2609. What would you say with regard to the other branches of the trade, such as pattern-making, burnishing, and polishing?—Pattern-making and chasing are very simple trades, and are not dangerous at all. I have notes of a case here to which I gave a good deal of attention in 1901, the case of a brass polisher who died, and on whom I held an inquest. Brannan was the man's name. I had a good deal of talk with Mr. Knyvett, and communicated with the Home Office about it. I have the draft of my letter to the Home Office dated the 23rd July, 1901.

2610. What is the point generally?—The material point, if I may so call it, is this. Here is the draft of the letter I wrote to the Home Secretary, and the significant part to me is, as you will see, that when I first drafted this letter I dealt with brass poisoning as the point of the case, but after I had held the inquest and considered the evidence a little I crossed out the parts about brass poisoning. I looked at the time in all my medical jurisprudence books to see if I could find anything about brass poisoning, because in that case Brannan was reported to me to have died of brass poisoning by a young doctor, who was very energetic and very sincere, called Moir. He was a doctor at one of the branches of our dispensary, and he put it fairly and squarely as a case of brass poisoning in just the same way as he would have reported a case of lead poisoning. He put it as a specific poison which had invaded the system and brought about certain effects. First of all I looked to see if I could find anything about brass poisoning in my books, and positively the only reference to anything of the kind I found was in Luff's book, which is one of the most modern books for cases of poisoning and you see there he says:—"Chronic copper poisoning is also occasionally met with among workers in the metal and its salts, and also among brassworkers." That is all.

2611. Then in fact, generally speaking, is it your view that, though brass workers may be subject to disadvantageous conditions from dust in general, you cannot say that specifically as brass workers they suffer more than any other trade in which there is dust flying about?—I do not think so. At the same time I should like to show you my original notes of that inquest. I have also brought a newspaper cutting book which I keep, which I will leave with you if you will undertake to let me have it back.

2612. (*Professor Allbutt.*) Is the doctor who gave evidence at the inquest still in practice?—I do not think he is still in Birmingham. The men who come to the dispensaries are young men, who are making their way, and they move on. For instance, this gentleman succeeded Mr. Murray, who I think has been before you. He succeeded Mr. Murray and inherited certain of Mr. Murray's notes and views: "First saw deceased 9th January, 1901." This inquest was held in July, 1901, six months later. "I went to him"—that means he saw him at his own house—"Suffering from bronchitis and anaemia. He pulled up a bit and grew a little stronger. I saw him once a week. After a while he came and saw me. His progress continued until the first week in April. He was considerably better then. I did not see him from then until rather over a fortnight ago, when he came to me. He was changed very much for the worse. He showed signs of tubercular disease of the lungs which he had not before. I attended him up to his death. I went to him at his house. He died on Thursday last, the 18th I made a post-mortem examination. Externally, nothing to notice. Emaciated internally, all organs excessively anæmic, heart flabby and soft, showed signs of fatty degeneration. Lungs congested with inflammation on both sides; tubercles scattered all over. Small cavity in left apex, tubercles throughout from the size of millet seed to that of hazel nut. Left lung strongly adherent to the parietal pleura. Other organs healthy except anæmia. Green line on gums. I noticed that the first day I saw him. Stomach was hour-glass shaped. Surface eroded, very much so towards orifice entering bowel. Pyloric orifice narrowed. Cause of death was chronic brass-poisoning and tubercular

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pneumonia." Then I questioned him. "Brass poisoning lowers the vitality by its effect on the blood and digestive organs. It does not directly cause pneumonia, but leaves the system ill-prepared to resist. I have met with a great number of similar cases in my practice at the Dispensary—pallor, marking of teeth and gums, pain and colic (abdominal), vomiting in morning, metallic taste in mouth, excessive night-sweats, general weakness, sometimes dizziness, frequently gastritis. These particular symptoms are confined almost entirely to brass trade. Lungs take in dust charged with zinc and copper. Skin also absorbs something. Hands sweating also. Sometimes they put tubes in the mouth (that means they use a brass tube between the lips). Remedies would be, perfect ventilation by purified air rapidly circulated. Also more precautions by workers themselves, such as respirators. I think brass workers ought to be seen occasionally by medical men." Then the jury put some questions, and in answer he said: "I do not think the sulphur fumes mentioned would have much to do with death. I have not come across many cases of casters, more of polishers." Then in answer to Mr. Knyvett he said: "The symptoms I have described belong more to polishers than to casters. It is proper to prevent food being taken in a polishing shop. I have seen iron polishers, but I find more cases in brass workers. I therefore think the evil arises from metal dust. I think it would be desirable that medical men should be called on to report brass cases as they do lead cases." That was the whole of the evidence. I asked Mr. Knyvett if he had anything to say, and he said: "Government Inquiry not long since on brass poisoning dealt with evils of casting and regulations were issued, polishing not touched by those regulations." The Jury found a verdict on the doctor's evidence of tubercular pneumonia facilitated by anæmic condition from brass poisoning. There is a report of the case in one of the newspapers, and another of our papers, "The Gazette," took the case up and wrote a leading article upon it. There was a great deal of correspondence on the matter, including a letter from

Mr. Davis himself, and a letter from Mr. Murray, because someone said Mr. Moir was taking credit for Mr. Murray's observations. I have never had, except from the Ladywood Dispensary, any suggestion of brass poisoning as a specific disease. You see Mr. Murray had been an officer there, he had taken this matter up, and thought he found specific symptoms of brass poisoning. Mr. Moir succeeded him, and had Mr. Murray's notes and experience before him, and Mr. Murray was present when Mr. Moir made the post-mortem examination, so that the two acted very much together. I have not had any suggestion of chronic brass poisoning from anybody else other than from Mr. Murray or from Mr. Moir, but I followed it up rather carefully at the time, because it is one's duty if one finds a loose stitch anywhere in a manufacture, such as brass is in Birmingham, to see whether anything can be done to remedy it. Mr. Knyvett gave a great deal of attention to the case at the time.

2613. Are you of opinion that there is no special danger in the brass trade other than the general dangers attaching to dusty trades?—That is my opinion, because I have never had any evidence to the contrary.

2614. As regards casting and founding, do you hold the same view?—I think the regulations which were made as to brass casting a few years ago met everything that could reasonably be suggested. They were the outcome of much deliberation. I do not know whether any of you gentlemen were connected with them, but it was gone into with regard to the whole of the brass trade.

2615. Still, brass casting was put down as a dangerous trade before those regulations were made, was not it?—Yes. Of course, the definition of "dangerous" is a little relative.

2616. Have you seen the invention for carrying off the fumes arising from a crucible by suction draught and a cover?—No, I have not. I have seen at one shop a very efficient system by which the dust is sucked downwards, but that was with reference to polishing and not casting.

Mr. W. C. McSTOCKER, called in and examined.

Mr. W. C.
McStocker.

2617. (Chairman.) Are you a brass finisher? Yes.

2618. That is not an unhealthy branch of the trade, is it?—No.

2619. What are you going to tell us about brass casters?—I have had a lot to do with them. I am the President of the Society of Amalgamated Brass Workers.

2620. Is it as the president of the society that you wish to give evidence?—Yes.

2621. Do you consider that the brass casting and founding is by far the most unhealthy part of the business?—Yes, there is no question about that.

2622. Would you agree with Mr. Davis that, taking the other branches of the trade, many of them, with the exception of polishing, are not unhealthy?—Not nearly so unhealthy as casting.

2623. Is it not the fact that your men die at an average age, and are rather older than their wives, taking the whole trade together and not dealing with casting only?—I have not gone into that question.

2624. Would not you agree that taking it on the whole as a trade comprising its six great branches, it cannot be said to be an unhealthy trade. I want to know, yes or no?—I should say it was as a whole an unhealthy trade.

2625. You have a trade with 7,000 men in it, and 2,000 of those men are casters, but apart from the casters it has, as I understand, been represented to us that the trade upon the whole is not an unhealthy one?—Well, no; taking it as a whole, I should say not.

2626. So that the real fact is, is it not, that the unhealthiness of the trade concentrates round the casters and the founders, and also amongst some of the polishers?—Yes, the casters first I should say, and then the polishers.

2627. Do you have a large number of casters who come upon your funds?—Yes.

2628. Is the proportion larger amongst casters than amongst other parts of the trade?—I should say yes.

2629. Very much larger?—Yes.

2630. What proportion should you say?—I think you will have to get those figures from Mr. Davis.

2631. I daresay you can help Mr. Davis in getting for

the Committee some accurate figures, because it is no use going on vague statements or suppositions. We want actual facts, and from your books it would not be difficult to take the past year, 1905, and exactly show how many more casters come upon your funds than others, would it?—It would be an easy matter I should say, and we can do it for you.

2632. Have you any knowledge of the illness from which the brass casters suffer?—From what I see it is catarrh of the stomach and lungs, bronchitis and blood poisoning.

2633. Anything else?—It is a most dangerous trade.

2634. (Dr. Legge.) Are you now talking of what you see on the medical certificates?—Yes, and from what I know by visiting.

2635. (Chairman.) To what do you attribute these diseases?—To the fumes.

2636. To the zinc fumes or the lead fumes?—To both.

2637. Have you any idea what proportion would be caused by zinc, and what proportion would be caused by lead fumes?—No, I could not answer that question. You see, I am not a caster.

2638. Would you be inclined to say that the larger number of these cases occur in the worst ventilated factories?—Yes, I should say so.

2639. The bad ventilation of a bad factory has a good deal to do with it, has it?—Yes.

2640. Would you go as far as to say that if you could have a perfectly ventilated factory with splendid apparatus, the men ought to be able to work in the casting shop free from disease?—No. It does not matter what the ventilation at certain times of the year is, the fumes hang about in the shop, and you cannot get them out.

2641. But you might have fans which would draw them, might not you?—I don't think a fan would draw them out.

2642. If you had a fan as big as a colliery fan you could draw it out, could not you?—I think it would be a difficult matter even then, because they are pouring, you see, the whole of the day, where there are two or three casters employed in one shop. November, I should say, is a very bad month.

2643. Can you give specific instances of men who have suffered in the way you mention?—Yes.

2644. I suppose the conditions are better than they used to be in the old days?—Yes. I have a case of a man named P., aged 48, who has been ill about eighteen months, suffering, in the first place, from Bright's disease, said by the doctor to be caused by the trade. This man is in the asylum now. I have another case of H. W. P., ill for the last three years through his trade. He was a strip caster.

2645. With regard to P., who has Bright's disease, how long has he been on your funds?—I do not know how long he has been on the funds. He is now in the poor asylum.

2646. Then he is not in receipt of funds from your society, is he?—They do receive relief although in the asylum, but I do not know whether in this case he is receiving anything.

2647. Then he is incapacitated altogether from work is he?—Yes. Then I come to the case of H. W. P. who has been ill for three years from his trade. He is a strip caster, and he tells me that on two occasions he scalded his foot with the metal and was away from his work 17 weeks and 12 weeks. That goes to prove that it is dangerous work. That, however, is not a case of poisoning. In a third case, the man is here—J. H. He has been in the trade 40 years. He has been ill 10 weeks, and has been unfit for work for a long time. He is here, so he will be able to tell you about it himself. Another case I have is an accident case. A man named P. met with an accident and was scalded so badly that he died in great agony. I have not got the date of that case. The next case I have is the case of G., who has been in the trade over 50 years, but was compelled to leave work two years ago. He has been ill on and off for many years.

2648. What has been the matter with him?—Bronchitis, I should say. Then I have another case—the case of J. O., which will go to prove to you that brass casting is far more unhealthy than iron casting.

Mr. JOHN RAMSDEN, called in and examined.

2659. (*Chairman.*) Are you Vice-President of the Amalgamated Brass Workers' Society?—Yes

2660. Have you been a brass caster for 45 years?—Yes.

2661. At what age did you begin the work?—Between 10 and 11. I have been nearer 46 than 45 years engaged in it.

2662. Then you must be fifty-six years of age now?—Yes.

2663. Will you tell the Committee whether you have suffered from the effects of fumes or gases while engaged in casting?—Yes, I have.

2664. Have you been engaged in casting ingots, or simply at fittings?—In sand.

2665. Have you done both kinds of work or one only? One only, practically speaking. I have done a little of the other work, but, practically speaking, I have been employed in the sand on steam and water fittings and such like.

2666. When did you first of all, carrying your memory back, suffer in any way from your work?—As nearly as possible, I should say it would be about thirty years ago.

2667. That would be when you were about 27 years of age, would it?—Yes.

2668. You had then been some 15 years at the work?—Yes.

2669. What did you suffer from?—Principally from what we call the smother, or fumes.

2670. What did you feel?—A kind of shivering, especially after I had been away for a time. If you ceased work on the Saturday afternoon and started on the Monday again, after being off a day or a day and a half, or two days as the case might be, you would get it very badly at night time. You would feel cold, and when you got to bed you would be all in a sweat, and shivery.

2671. That would be on the Monday evening, would it?—Yes.

He called on me a very short time ago and said he was very ill indeed. He happened to be doing a little iron work where I am employed, but when he finished the iron work he had to leave.

2649. Was he engaged in casting iron?—Yes; he could do both brass and iron casting. He came to me and told me he should have to go to the infirmary because he was so bad, and he wanted to know if I could get him an interview with Mr. Davis to see if anything could be done previously to his going into the infirmary. He has been ill a long time from bronchitis.

2650. How long was it after he left the iron work and went to go to the brass work that he began to get ill?—As soon as he touches brass the old complaint comes on him, but he can stand the iron casting better than the brass casting.

2651. Is he here to-day?—No, he is not; I think he has gone into the infirmary.

2652. (*Dr. Legge.*) How many years has he been employed in the trade?—I do not know, but he would be nearly 50 years of age. Then I have another case—the case of T. H., who is in a very bad condition, and who can be seen standing against the wall fighting for his breath. That is all through the trade.

2653. You mean that it is believed to be due to the trade?—I do not think there is any doubt about it.

2654. But people can get bronchitis without being in the brass trade, I suppose?—Yes.

2655. You cannot put it higher, can you, than that there is a high degree of probability about it?—Yes.

2656. Have you got the man here?—No, he is not here.

2657. How long had he been a brass caster?—I should say from 20 to 30 years. I have one or two other cases of accidents, but I will not trouble the Committee with them. Those cases I have mentioned are all the cases I have.

2658. (*Professor Allbutt.*) When you speak of catarrh of the stomach, and blood poisoning, and lung troubles, you are quoting medical statements, I suppose?—Yes.

2672. What would you feel like on the Tuesday?—Weak, and really not fit to work.

2673. Sometimes you went back to work on the Tuesday, I suppose, after such an attack?—Yes; the fact is I was compelled to; but I used frequently to have to go to the surgeons.

2674. How many times in a year did that happen in those days?—To be correct it would depend very largely upon the weather, that is to say, if you had a damp, dull day, and the shops were not so good as they are now, the sulphur fumes would stay a great deal longer. On a July day or an August day, when the weather was brighter and drier, the fumes would clear out a little sooner.

2675. Speaking of the time when you were between twenty and thirty, how many days did you remain away on an average, roughly speaking, during a year?—Roughly speaking, I should say, I should be off a fortnight.

2676. In single days?—Yes, I would not always be off on the Monday, but sometimes I would be away three days.

2677. Was the fortnight made up of one day, two days, three days, and so on?—Yes, that would be putting it low. If I said a month in days I should be more accurate I think.

2678. Would that include some days when you did not go to work because you were feeling tired and took a day off, as everybody does I suppose occasionally?—No; I have just been one of those who can honestly say I never took a day off in my life unless I was obliged to.

2679. Except when you were really obliged to?—That is so. Both my late employer and my present employer will testify to that.

2680. Then you went on, did you, with perhaps a fortnight off in the year. For how many years did you go steadily on up to the present time?—I went steadily on till it got worse.

2681. At what age did it become worse?—I should say when I was about 34 or 35.

Mr. W. C.
McStocker.

30 Nov. 1906.

Mr. J.
Ramsden.

Mr. J.
Ramsden.

30 Nov. 1906.

2682. What did you suffer from then?—I got illnesses of all kinds, and every medical gentleman I visited advised me to leave the trade.

2683. Did they tell you what was the matter with you?—They said it was the trade.

2684. That was the cause, but did they tell you what the malady was which was produced by it?—Rheumatism principally.

2685. What else?—During the past four years I have gone as far as pneumonia.

2686. When you were about 30 years of age had any pneumonia developed?—No, it had not. Rheumatism and influenza had because I had to come out into the cold air. Doctors think that you run out into the open to get a breath of air, and they put down the pneumonia to chills.

2687. Coming to a later age, what was the next stage. From 37 on to 57, what did you suffer from. When did the pneumonia begin?—About five years ago.

2688. Did the doctors examine you?—Yes, I have been examined all over plenty of times.

2689. Did they tell you it was pneumonia? Did they say anything else was the matter with you?—I have had ulcers on the bowels for a long time, for nearly 15 years I should say.

2690. How many days' work do you think you have lost of late years?—I have not been out of the doctor's hands during the last 12 years for three months at a time.

2691. Are you still at work?—I am still at work.

2692. How many days' work have you lost in the last five years; could you say?—I should lose about six weeks during the year, putting it very moderately.

2693. And during that time you have drawn sick pay from the society?—Yes, I have drawn my sick pay.

2694. You are already, are not you, qualifiable for superannuation?—That is so; I could declare on the superannuation fund to-morrow if I liked.

2695. But you do not want to do that as long as you have got work in you?—The fact is, it is not enough money. Five shillings a week is not enough to keep me.

2696. You have determined to go on at all events till you are worse before you claim superannuation?—Yes. By the bye I have been very cautious! I am not a total abstainer, but I have been very cautious; that is to say, I have gone out to get as much fresh air as I could.

2697. Can you tell us about any other men you have known suffering from the same thing?—I have the names of men who have been employed for a period of 16 years by my present firm, some of whom are dead already. Eight poor fellows went to their graves and only two of them reached 40.

2698. Out of how many employed?—An average of 16.

2699. At what ages, can you remember, did they die?—Yes I can give you the ages. R. A. was from 22 to 24 years old when he died. I think he was consumptive if my memory serves me right.

2700. He probably had a touch of consumption before he went into the trade even?—It may be so; I did not know him before then. E. A. would be from about 20 to 22. They were brothers. There is also a brother belonging to the same family in one of the hospitals suffering from blood poisoning who has not reached 21, although the father is at work to-day and is 60 years of age.

2701. Yes, but what was the mother like, I wonder?—She was a very healthy woman apparently. Then there is J. W., who worked under my superintendence, and his age would be from 35 to 37.

2702. What were his symptoms like?—It was principally the sulphur he used to complain of and say the trade did not suit him.

2703. Did he choke; what were his symptoms?—Yes, and cough very badly. Then there was T. B. who would be about 37, F. J., about 38 or 39, and H. J., who would be between 30 and 40. Then C. G. and T. P. were in their 41st year. I went to the funerals of the three latter, so that I know their ages correctly.

2704 (Professor Allbutt.) Your evidence is that there

is a tendency to bronchitis, I understand?—I think so—a tendency to bronchitis and asthma.

2705. Pulmonary disease?—Yes. I may say that my position in the society has brought me in contact with and I know more casters personally than anybody in the trade.

2706. (Chairman.) And you say, do you, that it is bronchitis which they have all got?—Largely. It is a cough which seems to be in the jugular.

2707. (Professor Allbutt.) Asthmatic cough?—Yes and not only in the Birmingham district. My duties call me all over the country; and I have been in casting shops all over the country. Here is a small portion of the fumes I gathered yesterday in my shop (producing some).

2708. Are you able to say how much of the illness is due to exposure and how much is due to the smother itself?—I am not prepared to say. I have a photo here taken of a man when the smother is at its full.

2709. (Chairman.) It seems to me that getting this powder stuff into the lungs and making them cough is the cause of the mischief more than anything else?—Yes, you are quite right.

2710. (Professor Allbutt.) Some of the symptoms you have described are the symptoms of what is called brass founder's ague, are they not?—Yes; we in rough terms, as workmen, call it the shivers.

2711. That has not anything to do with bronchitis at all; That is a separate thing, is not it?—I am not quite certain about that.

2712. What do you think it is: do you think there is some connection between the two?—Yes, I should rather think there was.

2713. Do you mean it lowers the constitution in some way?—Yes, you get weak and more subject to illness. Those who work in the copper department do not suffer so much as we do.

2714. Do you mean smelting copper?—Yes, for instance, there are copper castings.

2715. In copper smelting there are fumes, are there not?—Supposing I had to cast one of these bottles in copper; you cannot do it all in copper, but you put in a little tin. There would be scarcely any fumes from that; but directly you come to the brass you put in a great portion of spelter or zinc, which causes the smother. You get 60 or 70 per cent. more fumes from brass.

2716. Can you draw any distinction between fumes, that is to say volatile matter which might escape as fumes, and these varying weights of dust?—This dust, which I have here, is from brass, and I should like to say this which I consider very, very important. Apart from the fumes themselves, in the ordinary casting branches, there is the small work in the sand, you have a bag of this kind, and you are constantly shaking flour or brick dust or charcoal, so that you are choking the lungs up as it were. That seems to affect the men a great deal.

2717. What you call the red metal has more copper in it?—Yes.

2718. If you use this red metal with a small percentage of tin, you have none of these results, have you?—You do have a little, but very little. It would be 40 or 50 per cent. more in the case of brass.

2719. Is there in red metal smelting what I may call invisible fumes that might affect anybody?—Yes.

2720. But you do not think that of much importance, do you?—They are not nearly of so much importance.

2721. Do you know the other witnesses who are here?—I know most of them.

2722. Are they affected in the same way as you are?—There are some of the poor fellows who are here now who ought to be in bed really.

2723. Are they all bronchial people, do you think?—Mostly so.

1724. Would that be their characteristic condition?—Yes.

2725. Would you allow us to examine your chest?—With pleasure. My object is to tell the truth. I may say I was always counted as being wretchedly ill, and people used to say to me, "How ill you look," when as a matter of fact I felt well and was well.

2726. Is it the general experience that brass casters

become sallow in complexion?—Yes, a great many of them.

2727. But you think, do you, that that sallow complexion is of no very great importance as an indication of health or disease?—I think it is of importance.

2728. (*Chairman.*) Would you expect to find most of the men you have known, who were ill, rather pallid?—Yes.

2729. It is not a certain symptom but it is a guide to you, is it?—It is a good guide.

2730. (*Professor Allbutt.*) I thought you said you had been quite well yourself when you looked ill?—That was as to myself, but as a rule you can generally tell a caster. If you take me into any factory you like, and have the men all washed and clean, I could pick out the casters.

2731. But you would not go on to say that those people with the sallow faces were all necessarily ill, would you?—No, certainly not. I should like to add that there are a number of Societies, especially Societies of any standing, who decline to take casters in, and those who do take them in put them down at a lower rate. Hence we have a number at our Trade Union offices, because they will not have them elsewhere. I think I am speaking correctly when I say that the Hearts of Oak, the Oddfellows and Foresters, and the Ebenezer Society in Birmingham, in which they have nearly 11,000 members, refuse to admit brass casters.

2732. (*Chairman.*) And some you say admit them, but charge rather a higher rate of subscription, do they?—No, they give them less money.

2733. What is your own society?—The Cannon Street Male and Adult Provident Institution.

2734. What do you subscribe to that?—I was one of the fortunate ones. The average for brass casters used to be 10s. per week, while many of the other men insure for 14s., 16s., and 18s.

2735. But how much do you pay towards the society?—You pay according to the allowance you have out, but they will not let the casters insure for so much as the others.

2736. Taking your society, how much are you paying

per week at this moment?—I am paying 3s. 4d. a month.

2737. How much would you get in the case of being ill?—16s. a week.

2738. Is that less than you would get if you were in one of the much more healthy branches, such as the chasing or pattern making?—No, in that society they would not admit me to insure for 20s. a week.

2739. Does it come to this, that casting is considered more dangerous in the proportion of 16s. to 20s. Do I put it right in that sort of way—do you follow my question?—Yes.

2740. Would you say, suppose two men subscribed equally, it would be fair if one was a caster and the other was a chaser, we will say, that the one should get 16s. a week and the other should get 20s.?—As I have said, mine was an exceptional case; but the average would be 10s. for the caster and 16s. to 18s. for the chaser and pattern maker.

2741. You would put the casting down as twice as dangerous, would you?—They count it a mistake in letting me insure for 16s.

2742. A brass caster, I suppose, ought to get better wages than, say, a pattern maker or finisher perhaps, because his occupation is more risky?—He ought to do.

2743. But does he as a fact?—Not now. He used to formerly but not now.

2744. Why is it changed?—Because of the cheapness of the method employed. Every pattern maker and every employer wants to take out a bit more and put in a bigger sand core, and, as the caster is paid by weight, his work does not weigh so heavy.

2745. So they are getting it out of the casters by light shallow castings, are they?—That is so.

2746. (*Professor Allbutt.*) With the great improvement in the shops of late, is the prejudice against insuring casters any less?—The Societies have not relaxed their rules.

2747. Do you think they are likely to do so now?—I do not know; I should not care to express an opinion on that point, because I have been on committees myself.

MR. HARRY SMITH, called in and examined.

2748. (*Chairman.*) Are you an official of the Amalgamated Brass Workers' Union?—I am a Trustee and I am also a member of the Sick Visiting Committee.

2749. Has it been your duty to visit in many cases men who are going to receive or who are asking for sick pay?—That is so.

2750. What have you found those men suffering from as far as you could judge, not being a doctor—taking casters only?—From bronchial complaints generally—coughs, asthma, bronchitis, inflammation of the lungs, and all those sorts of complaints.

2751. In addition to those I believe occasionally you get what is known as a sort of sick ague in men who have been a short time in the trade?—Yes.

2752. That is rather a different thing from bronchitis is it not; that is a different complaint altogether?—Yes, but they put it down to the fumes—to the same cause.

2753. But still the two things are different, are they not? The sickness, which is occasional, is different to the cough and bronchitis, is it not?—Yes, it would be, but at the same time they complain bitterly about the sickness, and if it is not sickness they have always a coughing, and find great difficulty in breathing.

2754. Do you consider that they live under more dangerous conditions than the majority of the trade?—Decidedly.

2755. Do you agree that, if you take the whole of the members of the brass trade all round, it can hardly be said to be a dangerous occupation apart from the casters?—As to the brass trade generally, I should not go that far, but I have visited individuals who put in gas fitting where they use white lead and they have to suck the work to see whether it is sound enough, and I have come across several very bad cases of blood poisoning.

2756. You would hardly call such men brass casters, would you?—Not brass casters, but they are engaged in brass manufacture.

2757. Do you mean there is another branch which is dangerous, namely the fitters who are engaged in screwing the fittings together with white and red lead?—You see some of the fitters have to put their own work together, and in putting it together they use white and red lead, and they have to suck the work, which causes lead poisoning.

2758. If you omit those men and omit the casters, would you agree that the brass trade generally, apart from those two, could hardly be considered a very dangerous trade?—I should say not.

2759. But those two branches you do consider distinctly sources of danger, do you?—Yes.

2760. Is there anything else you would like to add?—I could mention one or two very bad cases amongst casters who are not able to come here.

2761. They are representative cases I suppose; they have the cough and you put it down as a bronchial cough. You draw our attention also to lead cases?—Yes.

2762. Those men ought certainly be prevented from putting the ends of the pipes in their mouths, ought they not?—They should.

2763. A little sucking machine, surely with a foot bellows would do the whole thing?—Yes, but the manufacturers, as far as my experience goes, will not go in for those things for the sake of a pound or two.

2764. Has your Union, that has often pressed them upon other points, ever determinedly pressed them upon that one?—I believe Mr. Davis has.

2765. But as a Union, you have never threatened to strike unless they did it?—No.

Mr. J.
Ramsden.

30 Nov. 1906.

Mr. H.
Smith.

Mr. W. BAKER, called in and examined.

Mr. W.
Baker.

30 Nov. 1906.

2766. (*Chairman*.) Are you a member of the Executive of the National Society of Amalgamated Brass Workers?—Yes.

2767. Are you a brass caster yourself?—Yes.

2768. How many years have you been so?—29 years.

2769. How old are you now?—I am 42 years of age.

2770. You are not suffering from anything yourself, are you?—Last year I had to go away for a fortnight to Blackpool, because I got catarrh of the stomach. Dr. Jessop said it was through my trade, and I was to go away to get rid of it. He also asked me if I could get out on the sea and get seasick. I did. I took a trip to Ireland. I had been steady and saved money, and I took the opportunity of going.

2771. Did that completely restore you?—No, it is coming on again. I had to go and see him the other night. I have a taste of fish in my mouth now. I do not suffer from ague, but I suffer terribly in my head. I have headaches for a month at a time. It goes off when I am away from work on my holidays, but it comes on again when I come back.

2772. Were you brass casting yesterday for instance?—I have been brass casting this morning.

2773. If you left off for a day or two would the taste in your mouth go? Is it produced by the zinc fumes?—Yes, and as soon as ever I poured I should have the taste of it again. My men in the shop suffer in a different way to me. As soon as ever we have poured they say, "I shall see them to-night." That means they will have bad dreams. It is like having delirium tremens, and there is the shivering, nothing will keep them warm; they suffer awfully with it.

2774. That form of suffering does not last very long, does it?—It lasts all night, and that is quite long enough.

2775. But there is another complaint said to be got. I suppose, and that is the coughing?—I can tell you of a case of a man who worked at a shop here named E. He was but 28, and he used to wear a sponge round his nose, and you would see when he had done pouring the white from the zinc would be all round it. He had been there at work about eleven years when he had a fit of coughing and broke a blood-vessel. He had a long illness, his place had to be filled up, and he went to work at another place, where he broke another blood-vessel, and repeatedly vomited blood for days after, and it eventually killed him. He was only 28. I had another caster working with me at another shop, where we used

charcoal and flour, which got down into his stomach and corroded there, so that it formed a kind of ball at the bottom of his stomach. He had a long illness. The doctors tried to fetch it away by blistering his back, and one thing and another, but they could not, and he broke a blood-vessel eventually and died. He was a teetotaler, the same as I am.

2776. He broke the blood-vessel through coughing, I suppose?—Yes.

2777. Do not you think that was due more to lung complaint?—Well, you see he had dust on his lungs to irritate him. There is a man on the funds, 55 years of age, who suffers from breaking out and blood poisoning, which the doctor says is due to his trade.

2778. Do you mean when you say he has blood poisoning, lead poisoning, or do you know what it is?—It is caused by his trade.

2779. But you do not know, do you, what the substance is that has poisoned him?—No, but it is something which is in the metal. I mix my own metal and I have to put lead in it.

2780. But of course you must remember that metal poisoning is one thing, and lung disease got by the dust is another and different thing?—Yes, but there is a lot of dust in a casting shop.

2781. But they are different things, and when you say blood poisoning, which do you mean? Do you know?—If I were to cut my hand with gun metal, which is composed of copper, tin, and lead, and was not in good condition, my hand would poison.

2782. Of course it would, but it would poison also if you cut it with piece of bottle glass too?—Not so much as when we get gun metal burns; it is awkward for us then.

2783. But burning is a different thing altogether; burning produces results of its own. If you cut yourself with a piece of gun metal you may get a very bad place, but you may get it also with a bit of bottle glass, may you not?—I have never had my flesh take such bad ways with glass as I have with metal. I regard cutting the flesh with metals, with copper, and zinc, and lead, in them, as very dangerous, and I regard it as more dangerous than the dust. I have cut myself often with gun metal and other metal, and have had bad hands from it. They have festered and matter has come from the wound.

TENTH DAY

Thursday, 6th December 1906

MEMBERS PRESENT.

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.
Professor CLIFFORD ALLBUTT, F.R.S

Mr. T. M. LEGGE, M.D.
Mr. T. E. BETTANY (*Acting Secretary*).

Mr. JOHN HEDLEY, M.D., called in and examined.

Mr. J.
Hedley, M.D.

6 Dec. 1906.

2784. (*Chairman*.) Are you a medical man in practice in Middlesbrough?—Yes.

2785. Have you been Mayor of the Borough?—Yes.

2786. Have you had experience for some years amongst the men who work in the basic slag industry?—Yes.

2787. Do those men suffer from certain complaints arising from their industry?—That is a very difficult question to answer, because the North-Eastern Steel Works, for example, claim that the time lost by men

working in the basic slag mill is not anything like as much as the time lost by the ordinary workers in the steel works. I have had experience of slag dust men, because, when they started to grind slag in 1886, I was Surgeon of the North-Eastern Steel Works, and then there is no doubt that the men complained of what they called a slag cough and would come to get a cough mixture. They also said that that was preceded always by a cold. The cold they attributed to the nature of the employment. A mill is a draughty place, and there

was, in the earlier part of the industry, a very great deal of dust floating about; but apart from coughs and bronchial ailments, we were unable to say that there was anything else of a serious nature to which they were liable. There were a few cases of pneumonia, but still there was not a very great number of pneumonia cases until what we called the great epidemic of 1888, when Dr. Ballard came down from the Local Government Board to make an inquiry into its cause. The mill was burned down, and they erected a new mill, which was a very much better one and which limited the dust very much. Since that time the diseases attributable to slag dust have not been anything like so bad or so frequent.

2788. Do you think there is a disease which is clearly attributable to slag dust?—I do not. Slag dust, as we see it, is not very much worse than dust in the ordinary occupations of all iron and steel workers, because every iron and steel works is a very draughty place, and often a very dusty place, but I do not think there is a much greater proportion of chest affections amongst workers in the slag mills than amongst those working in other departments of the iron and steel works.*

2789. (*Professor Allbutt.*)—That is to say, certain grinding dusts cause certain diseases, but it is not especially slag dust that does it?—Quite so.

2790. (*Chairman.*) Are the complaints or diseases which are caused by the dust distinguishable from similar complaints among persons who are not working in any of these industries?—The only difference I know is that the men at the beginning complain of a cold, and they all rather speak of a cold being the beginning of their cough, if they have a cough. At the beginning they expectorate a little dark coloured mucus, and then the next day the mucus is whiter than an ordinary normal mucus. The cold goes away with a little cough mixture. They do not lose any time and then they are all right again. It might help the Committee if I were to repeat the evidence given to me by two men the night before last at Middlesbrough. I got the North-Eastern Steel Company to send the men to me. I had examined six men five years ago when I wrote an article in the *Dangerous Trades* book edited by Dr. Oliver. One of the men who came to me then was a man named

———. He is 58, has worked at the slag mills 18 years, and he worked at the steel works four years before that. He has been in fairly good health during that time, but he had pneumonia in 1897. Then it arose because he had got cold after sweating profusely—got cold on the Sunday, and took ill on the following Saturday with pneumonia; very bad for about a week, and was back to work in two months. He said, "Basic never affects me except when I get a bit of a cold, and then I get a bit of tightness at the chest." He is now rather rough in the voice, due to cold, which laid him off three days last week, then had bad headache and tightness of chest with cough. He had pneumonia again in 1902, not very severe, off eight weeks. With these two exceptions he has hardly been laid off at all, has lost no time except those two times and the three days last week; chest measurement 37 inches on inspiration, 35 inches on expiration. Breath sounds rather accentuated, and expiratory sound louder than usual; no rales in the front of the chest; slight crepitation round the base of the chest; voice rough from cold. Artery at wrist shows slight general degeneration, slight hardness; heart's action regular and sounds normal, feels strong and well and quite fit for work, now that he is getting rid of the cold. I think he has had influenza. Weight 11 stone 6 lbs. The next man I questioned was named ———, aged 48, who is employed in a very dusty part of the mill, where the grinding begins and the dust comes right off. He has worked at the mill 14 or 15 years. He says: "Have had the best of health there, and all my life have never been off work from ill-health all the 15 years, but I confess to occasionally losing a little time when I get a drop of beer, but only a couple of days. I think we at the mill are more subject to colds than many other workmen, but it is due to the draughts through the place; we get hot, and then the draughts through the place cool us quick and we get cold. When we have cold then the basic catches us here" (putting his hand to the top of his chest). "We make as much as 7s. a day, but we have to keep ourselves well." He said he thought a glass of rum in the course of the day was a good thing to keep them well. Then his remark is, "a good constitutioned man who takes care of himself is all right." Chest measurement 39 inches on inspiration 36 inches on expiration, well formed, muscular, sounds of chest normal except that at the base low down

there is a little rough breathing. I think he would pass as a good ordinary life for insurance. Weight 11 stone 7 lbs. Arteries healthy. Of the other men whom I examined five years ago, one was killed, one died of pneumonia, and the others left to work elsewhere. I found also that the North-Eastern Steel Works employ 54 men at their slag mill; 18 men have worked there over ten years, eight men from five to nine years; 20 men from one to four years. Of the 54 men, 19 have lost time from illness—17 once, and two twice. Very little time is lost by them compared with the men employed in the other parts of the works. That is what they claim. The manager says, of course, it is a nice job, with no hard work, and the men lose very little time.

2791. I notice that in your article in Dr. Oliver's book on *Dangerous Trades*, you quote the report of a Superintending Inspector of Factories in 1893, in which the Superintending Inspector says of this dust:—"Being in its nature extremely fine, it has a tendency, when inhaled, to settle in the farthest ramifications of the air passages, and to induce in the mucous membrane of these a chronic state of irritation, thus rendering the larynx and bronchial tubes unduly susceptible of further mischief should the subject take cold; and, in general, creating a distinct predisposition to bronchitis and pneumonia. Moreover, it is found that when pneumonia does supervene, a fatal result not unfrequently follows, with unusual rapidity. But even in a case of complete recovery, from an acute attack, the patient will be constantly liable to a recurrence of the same malady as his breathing apparatus is continually undergoing deterioration, so long as he is subject to the influence of the dust." Do you agree with that? Not entirely. Was that Mr. Gould's report? Perhaps you would quote also Dr. Ballard's observations.

2791.* Dr. Ballard says: "The slag dust to which the epidemic had been attributed was not the cause of the pneumonia, but that when from any cause pneumonia becomes epidemic, persons largely exposed to the inhalation of this dust may and do suffer more than persons not so exposed, and that the disease with them is of high fatality." Is that the passage you mean?—Yes. I think that amongst men getting pneumonia who work in the slag dust the death rate would probably be a little higher, but we have no statistics about that. As a matter of fact I think that Dr. Ballard found that the highest death-rate was in one of the ship yards.

2792. There is nothing, is there, to distinguish the pneumonia from which these workers suffer from pneumonia from which other people suffer?—No.

2793. Is there anything to distinguish what is called the basic slag cough from other coughs?—I think I could distinguish it. It would be attended by greater roughness of voice. The slag dust is very heavy, and I think it becomes arrested about the mucous membrane of the pharynx and larynx and creates an irritation, causing a roughness of the voice which lasts a little longer, and is slightly of a different character to the ordinary rough voice which some people get when they have a cold. The men employed in the work nearly all complain of their voices being rough. I have an analysis of slag dust which I will give to the Committee. It is as follows: Silica, 13.9; alumina, 5.92; ferrous oxide, 8.6; ferric oxide, 4.3; lime, 45.2; phosphoric acid, 13.21; magnesium oxide, 4.01; manganese oxide, 2.5; sulphur, .62; total, 98.26.

2794. Do you find any cases of men suffering from this cough incapacitated thereby from work?—No.

2795. Invariably is it all that is necessary that they should have a cough mixture, and then they get over it unless pneumonia should supervene?—Yes, that is what they say. They hardly ever lose time from the cough, but they all confess to being rather fond of a glass of beer, the job being a dusty one.

2796. Do you say that there has been a distinct decrease in this complaint since the North-Eastern Steel Works Company erected their new mills, which are better ventilated and equipped?—Yes.

2797. Are there any other mills of the same kind in the Middlesbrough district?—There is a mill recently started at South Bank by Alexander Cross and Sons, called the Cargo Fleet Mill. That is a very large shed, and at one end of the shed is a mill where they grind by means of a drum and steel balls. The material, having gone through that process, comes out ground fine slag, and runs in a continuous stream into a bag. That process does not give rise to so much dust as is found in the North-Eastern Steel Works, where the slag comes

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into a trough, and then a lever is pulled, and it all comes down together, filling the bag, and causing a good deal of dust to escape from the bag. Still, the Cargo Fleet Mill is a dusty place, but it has only been running this year. I questioned six men engaged in what I considered the dustiest part of the place, and none of them would confess to anything; they said it did not trouble them at all.

2798. Are those the only two mills of the kind in the neighbourhood?—There is another belonging to Bolckow, Vaughan, and Company, which is worked on the same principle. I have not visited it recently, because I have not had occasion to go there, and I had very little time for doing so after receiving your invitation to give evidence. It is pretty much the same kind of mill, and I telephoned to Dr. Glenn at Grangetown, who attends most of the men, and he said, while they were rather subject to coughs, he could not say they were more subject to lung diseases than any others employed in steel works at South Bank. Dr. Steel, of South Bank, however, thinks the workers in the slag mills are more liable to bronchial affections than the generality of iron and steel workers.

2799. (*Mr. Cunningham*.) I should like to draw your attention to one or two of the paragraphs in your report in Dr. Oliver's book. You say: "With regard to the causation of chest affections, there can be little doubt that it produces increased action of the bronchial mucous membrane, and consequent cough. But unless this is accompanied by such influences as wet, cold, exposure, or drink, there is no reason to think that it is the cause of acute bronchitis." Does that still represent your view?—Yes, I am still of that opinion.

2800. Again you say: "It will be seen from the chemical analysis of the slag that there is nothing in it of the nature of a poison such as to produce immediate injurious consequences, beyond such effects as may be traced to its mechanical action upon the bronchial tubes and air cells." Is that your opinion still?—Yes.

2801. You also say: "Inquiries have failed to elicit that any undue proportion of slag workers have been attacked by pneumonia." Is that true?—I think that is substantially true, but one could not say absolutely without having more accurate statistics on the question. Dr. Dingle, our Medical Officer of Health, failed in his inquiries to find that the disease was more frequent among slag workers than amongst others.

2802. You also say here: "Slag dust does not play any prominent part in causing pneumonia." Does that still express your opinion?—Yes.

2803. Then in this report you point out the great desirability of the use of respirators of some kind, do you not?—I do.

2804. And I suppose if you really could put a tolerably perfect respirator on the men, and insist upon them wearing it, which would be a difficult matter, that a large portion even of the affections as to which you have given evidence would disappear?—I am sure it would, but no one has ever supplied a proper respirator. Mr. Gould, who made a very thorough investigation of the trade, suggested a respirator which does not unfortunately fulfil the requirements, that is to say, it is simply a mouth and nose bag. Of course, as you know, in expiration this cloth gets wet and the fine dust stops the interspaces of the material, with the result that the men cannot breathe, and you nearly always see them with them hanging under their chins. They make a little show of putting them on, but they really do not wear them.

2805. May I take it that you are unacquainted at present with a really good respirator?—Yes, I suggest something of the sort at the end of the article to which you have referred, but as I ceased to act as doctor to the steel works I did not proceed with it.

2806. Then may I sum up your view in these words: that though the inhalation of the dust may be to some extent a contributing cause of coughs, it is doubtful whether it can be called a trade disease, and, if it is a trade disease, it is one that is very preventable?—Yes, I think so; that sums up my general view of the subject.

2807. (*Professor Allbutt*.) Have you seen any post-mortem examinations of the lungs of men attacked by this dust disease?—During the epidemic of pneumonia I saw, I think, two, but they did not present any difference in appearance to those of other men who have died of pneumonia.

2808. When you use the word 'pneumonia' may I add

an adjective to it; would it be what is called lobular pneumonia?—Yes.

2809. In pneumonia arising from dust you would expect to find lobular or bronchial pneumonia?—Yes, I think so, because if slag dust can be blamed for pneumonia at all, it would be more likely to cause bronchial or lobular pneumonia than acute lobar pneumonia. The former, being accompanied by bronchitis and of a patchy nature, might be supposed to be an extension from the tubes to the smaller lobules of the lung, and in that case the dust might be the exciting cause. But I look upon acute lobar pneumonia as a specific disease, and caused by a bacillus in a similar way to enteric fever, and while the nature of the occupation, with probably habits of carelessness or intemperance, may diminish the power of resistance and thus increase susceptibility, I cannot look upon it as a cause of the disease.

2810. I suppose bacteriological examination has not been made in these cases?—Yes.

2811. This pneumonia is not confined to persons working in the dust, is it?—No.

2812. And the enhanced susceptibility of workers in dust you think is a matter of speculation?—Yes, as a matter of fact there was rather a curious thing happened, for almost coincident with the beginning of the grinding of basic slag, or about 18 months after, we had this outbreak of pneumonic fever, and there was a popular idea that it was caused by basic slag. As I had a good deal to do with public affairs, I moved in the council for an inquiry by the Local Government Board. Dr. Ballard came down and spent, I should say, six months there, and gave a very exhaustive and complete report, with the result that he came to the conclusion that it was an infective pneumonic fever, and in no way connected with the dust of the place.

2813. When these men suffer from any transient catarrh, do they not spit for a day or two dark-coloured mucus?—Yes.

2814. That is your experience of almost everybody who lives in a dirty town?—Yes, it is.

2815. And, as it clears off in the course of a day or two, it arises presumably from the naso-pharyngeal passages only?—Yes, it does.

2816. And the hoarseness of voice is probably to be attributed to some affection of the upper air passages?—Yes, I think it is: I think it is a catarrhal affection of the larynx produced by the irritation of the dust upon the vocal chords.

2817. So that when these people fall ill with any disease affecting their breathing, it may be attributable only to a pharyngeal affection?—Yes.

2818. Can you say whether after death the larynx has been examined in these cases, and has been found to be affected or altered?—I could not say.

2819. In any of the cases which you have been good enough to state to us was there emphysema?—No.

2820. Would you not in dust diseases expect some degree of emphysema?—Yes, I should.

2821. (*Dr. Legge*.) I wish to quote to you some figures that I have with regard to the incidence of respiratory disease, and especially of pneumonia, among basic slag workers, and to ask you whether you think they point to conditions of work very different from those in the basic slag works around Middlesbrough. This is an extract from a report made by Dr. Wutzdorff on the basic slag works of Germany which appears in the publications of the Imperial Health Office in 1897. In 1892, in 18 works 91.1 per cent. of the workers became ill; 56.4 per cent. of the cases were diseases of the respiratory organs; there were 24 deaths, of which 19 were due to respiratory diseases. In 1893, in 21 works, 108.9 per cent. became ill; 54.5 per cent. of the cases were due to respiratory diseases; there were 22 deaths, of which 18 were due to respiratory diseases. In 1893, in a single factory near Dusseldorf, with an average of 100 workers, there were 68 illnesses, involving 799 sick days, and among them were 29 cases of bronchial catarrh and 10 of pneumonia. If you could furnish such figures as those, we should have been obliged to recognise the disease as one which does affect the men seriously?—I did. I mentioned to you the number of men who had been off.

2822. Are the men employed permanently?—I asked the manager to send me a list of the names of the men; the length of the time they had worked, and the time they had been off, which I can show you. It is rather

curious that that was such a favourable account that I telephoned the manager of the works and said: "This report of the number of men employed and the time they have been off is far too rosy; they will never believe it, and it is outside my experience of workers generally." Then he wrote me a letter and said: "I assure you it is correct; the particulars are taken from the books, and so far as I can make out it is quite true," but he said: "Of course, there is no account of the accidents or the deaths." I think there were four men who met with accidents in the last two years.

2823. Do you know whether any of the deaths were due to respiratory disease?—I think some of them were. The men themselves told me that some of their mates had died of pneumonia.

2824. Do you think the figures I have given can have any relation to the condition of things in Middlesbrough?—I think not. I have here a letter which Mr. Cooper, the manager, sent me when I pointed out that it was such a good report. He says: "Dear Dr. Hedley, with further reference to your letter of yesterday's date and to the letter I sent you, I have had this list very carefully and exhaustively examined and checked, with the result that it has been found to be quite correct, with the exception that in four instances men have been off on account of accidents, and these are not shown on the list, neither have we shown where a man has lost a quarter owing to drink. As regards the time the slag-mill men have been off through illnesses, this list is perfectly correct. However, to give you more detail, I have had filled in the nature of the illness from which each man suffered at the time. We have, of course, been obliged to get this last information from the men themselves, not having kept any account of this. With reference to the six men whom you examined in 1901, viz., —, the two last named we are sending to you surgery at 5.30 to-night in accordance with your request. Two others, —, have left our employ; — I find on inquiry died of pneumonia some time ago. — as you know, was killed by an accident last year. Regarding your suggestion that the time given is too good, I would point out that the time lost by men working at a place like our slag mill is not to be compared with that of men working at iron and steel works. The jobs in the slag mill are about the softest that men could very well wish for; they are always under cover, and the work they have to do is, compared with that of the iron and steel worker, very light indeed. Of course, I cannot trace the men who have died since they left us, because, as you will readily understand, we lose sight of them as soon as they are gone, and the list I sent you only represents the men who are working at our slag mill at the present time. Yours very truly, Frank W. Cooper." Then I find there have been 10 cases of pneumonia which they can account for out of those who were employed during the last 18 years. Taking — who has been employed 19 years, he had pneumonia 10 years ago, and I

attended him myself. Then —, who has been employed there 14 years, has twice had pneumonia; Hedley, M.D. —, employed 15 years, has had it twice.

2825. What are the symptoms from which the workers in your district suffer?—As a matter of fact the men in our district all present rather exaggerated appearances or sounds of the chest. I think almost without exception all workers in metal of a pretty good age are a little bit wheezy, and you find rather a loudish expiratory murmur even if there is no kind of wheeze.

2826. Would you say that pneumonia is prevalent amongst the workers in iron and steel works?—I can only speak for our place. We have a very bad reputation in Middlesbrough, and it is prevalent.

2827. Is it more prevalent, the dustier the nature of the work?—No, because a great number of the cases are amongst women, and a great many of them occur in the same house as an original case of pneumonia.

2828. When the writer of that letter which you read says he has to take the word of the workmen as to the illnesses they have had, what is your experience as to workmen's statements as to their own illnesses?—I asked him if he took the accounts from the books or if he asked the men, because the men are apt to forget their ailments, and he said they were taken from the books. My experience of men is that they rather readily forget illnesses from slight ailments.

2829. Or if they thought they would lose their employment attribute them to some other cause?—No, I do not think that would influence the evidence of the men in in our district. They are the most independent class of people you can meet anywhere, and they can get a job anywhere, generally speaking.

2830. (*Professor Allbutt*). Putting it generally, as your experience has enlarged, and your information as to these cases has been spread over a long time, and you have seen more of the conditions of labour, is your opinion rather modified in the direction of exculpating the dust?—Yes.

2831. You seem to have had formerly rather stronger opinions than you hold now?—Yes; but I am more and more convinced that there is no very large proportion of disease arising from the dust.

2832. Has that been at all coincident, do you think, with less intemperance amongst the men?—There is decidedly less intemperance, and we find an improvement in health. Our annual health bill is better than it used to be, but still we have a very large number of men who indulge over the week ends. They make what they call big money; they will give their wives less than is necessary to keep the house comfortably, and spend the rest in drink.

2833. Is it not your experience that people who drink too much beer or spirits are apt to get thick in the voice?—Yes, it is certainly.

Mr. CHARLES VINCENT DINGLE, M.D., called in and examined.

2834. (*Chairman*). Are you Medical Officer of Health of the County Borough of Middlesbrough?—Yes.

2835. Have you been there many years?—Nine years.

2836. Have you had experience of workmen engaged in the basic slag industry?—Yes, to some extent, but my experience has been more that of the statistics relating to the town than that of personal observation of the illnesses of the men, although I have had some of these men in hospital under my care.

2837. Have you any statistics which show the degree of prevalence of any specific kind of cough amongst these workers?—No; I am afraid I cannot give any actual statistics. The death returns that I receive from the Registrar have not given the employment, and I have not been able to separate the cases which have occurred in the different trades.

2838. Have you any reason to think that any considerable number of men lose time or are incapacitated from work by this cough?—Yes; I am informed by the doctor who is at present surgeon to the works, that he is constantly attending these men, but they are very quickly better from the slag cough.

2839. Do they actually have to leave their work on account of it?—For a day or two—they are off work for a day or two.

2840. Do more serious diseases often supervene from this cough?—No; pneumonia may follow it, but only in

the same way as it might among workers after a bronchial cough. Mr. C. V. Dingle, M.D.

2841. Can the cough be distinguished as being a specific kind of cough attributable to this dust?—I have had no personal experience of the cases of slag cough. I only have the word of the doctor who has attended such cases, and the impression he gave me, when he was talking about it, was that he could distinguish a slag cough from an ordinary bronchial cough.

2842. But in any case the cough would never incapacitate a man for seven days or more, would it?—No. His experience was that after they got some cough mixture and had a good drink they were quickly better. They seemed to think that alcohol helped to clear it away very rapidly.

2843. Is there a great deal of pneumonia at Middlesbrough?—Yes; a very great deal.

2844. Are there cases of pneumonia of a somewhat different type to the ordinary pneumonia?—Yes. Since I have been Medical Officer of Health there, we had an epidemic of pneumonia very similar to the epidemic of 1888, which Dr. Ballard investigated. It lasted over the years 1899 and 1900, and in the year 1900 we had no less than 543 deaths from pneumonia registered in the Borough. It apparently was a more severe epidemic than the one investigated by Dr. Ballard in 1888.

2845. He was of opinion that this pneumonia was not

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quite the same as ordinary pneumonia, and termed it "Middlesbrough pneumonia," did not he?—Yes.

2846. Are you of opinion that it can be distinguished or is different in type from other pneumonia?—I am very strongly of opinion that there is a type of pneumonia in Middlesbrough which is very different to the ordinary type.

2847. Does this pneumonia, do you think, attach simply to the locality, or to certain trades in the locality?—It affects the whole population of the Borough.

2848. Does it affect the whole population of the Borough in equal degree?—It affects all districts in the Borough, and I would almost go so far as to say that it affects all classes in an equal degree.

2849. Then it is your opinion that it is distinctly a local disease, and not in any sense an industrial disease?—Yes, it is a local disease, though I may go a little further and say I think the industries of the place have something to do with it.

2850. In what way?—I think most of the inhabitants of Middlesbrough are exposed to the respiration of very irritating air. At certain times, when the wind blows from certain directions, the air of the town is full of grit.

2851. Is that from the slag heaps?—I should take it to be from all the different works—from the blast furnaces, the forges, and from the many works which have forced draught. There are given off sharp particles of ironstone, sharp particles of coke dust and lime, and other irritating materials, which on a foggy day, with the wind blowing from the works, float over the town, and you can feel them, and they often get into your eyes, causing much smarting and pain.

2852. Do you think the men engaged in these industries suffer from respiratory diseases more than the rest of the population of Middlesbrough?—No; there is no evidence of that at all. Of 187 cases of pneumonia notified in 1900, 49 were females and 25 were young males under 15 years of age.

2853. In particular with regard to the men engaged in the basic slag industry, should you say there was any specific disease?—No; I have no evidence of it at all.

2854. Not even that they are more affected by the ordinary pulmonary complaints?—No; the ordinary pulmonary complaints are excessively high in Middlesbrough.

2855. But not particularly high in any special trade?—No, it is almost as high among women and children as amongst the male population. The men who suffer the most were labourers, including dock labourers, and all forms of outdoor work.

2856. Do you think that the basic slag workers are specially liable to attacks of phthisis or any other disease?—No; there is no evidence to all of that. I made inquiries, but the medical officer to the works said he knew of no other disease they were specially liable to except the slag cough and pneumonia.

2857. (Mr. Cunynghame.) A table has been handed in by Dr. Hedley showing the number of times various persons employed at the North Eastern Works are laid up through illness. Have you seen that table?—Yes.

2858. I notice that there is a remarkably small number of times that men have been laid up through illness. I cannot quite reconcile it with your statement that there are a good many cases of men being laid up?—That is a statement made to me by the medical officer to the works, and I think he referred more to the slag cough, a disease to which they attribute little importance.

2859. Are we to take it that when the word "illnesses" is used here it means only slag cough?—I should say that it means more severe illnesses, and not slag cough.

2860. With regard to the table furnished, what is meant by the word "illness?" It cannot represent the illnesses you have been speaking of, which are numerous can it?—I take it that it refers to cases of men who have been off work for some length of time.

2861. How long?—Over a day or two; there are many men off a day or two days from alcoholic excess. They would not be mentioned in the table.

2862. Would a man who had been ill a day or two, not from alcoholic excess, come into this table?—I should doubt it.

2863. Then how has the standard been laid down on

which this table has been prepared —That is a return from the manager of the works.

2864. Does it mean a month's or a fortnight's illness?—I should say it meant men who had been laid off more than two or three days.

2865-7. Then it refers to cases which you are not alluding to in your evidence, does it?—It refers, should say, only to illnesses from pneumonia.

(Dr. Hedley.) May I say the men themselves have said that there are very few cases indeed of slight illnesses; that they would have a little cough, go to the doctor and get a cough mixture, and it was the rarest exception for them to be off?

(Mr. Cunynghame.) But Dr. Dingle has told us that there are many cases of short abstention from work on account of cough?

(Dr. Hedley.) I think Dr. Dingle is dealing with his conversation with the doctor at the works.

(Mr. Cunynghame.) Then his opinion contradicts the evidence which you have given here?

(Dr. Hedley.) Yes, it does.

2868. (Mr. Cunynghame to witness.) There are two assertions, one that there is a very small amount of small illnesses, and the other is that there is a great deal?—The doctor to the works says that he frequently attends men suffering from slight cough.

2869. (Professor Allbutt.) Have you any information, official or unofficial, from the men's representatives as to their illnesses?—Yes, I had a long talk with the foreman of the works. In these works many of the men work on contract, and are engaged by the foreman, and not by the manager of the works. I believe about half at least of the men are engaged by the foreman and paid by him.

2870. Is he a sort of ganger?—No, he is rather a contractor. He tells me that he has worked at these particular works for 19 years, and has had pneumonia himself once during that time. I asked him about the illnesses amongst his men during the period of service there, and he told me that altogether he thought 12 men had died from pneumonia during the 19 years of which he had cognisance.

2871. Out of how many men employed?—The number of men employed for some years was 40, but now there are 55 altogether. I think he referred to the number of deaths amongst his own men who would probably be represented by an average of 30.

2872. Would you say from the conversations you have had with persons who might be considered as officially or unofficially representing the men, that the impression given you would be much the same as that given by conversations with managers and proprietors of works?—Yes; both versions seem to me to agree. I only know of one man who has worked in those mills who has died this year. He died in the North Ridin Infirmary in September.

2873. What was your experience before you went to Middlesbrough; was it in the North Riding?—I was at various places in the South and abroad.

2874. Would you consider the district as one in which respiratory diseases are somewhat over the average?—Yes.

2875. Have you ever examined the dust from the ledges and sills of private houses?—Yes. The owners of houses complain of the rapidity with which house spouts become blocked up.

2876. Can you tell the Committee what that dust consisted of?—I have no chemical analysis of it, but it is of a very gritty nature; indeed, it is really like fine sand.

2877. So that the dust, if it be a cause, is one operating over a large area of the city?—Over the whole area.

2878. Would you expect to find special prevalence of dust in the works?—I think the greater part of the dust misses the works and settle further away.

2879. Do you think the dust might be as effective at a distance as in the works themselves?—Yes.

2880. In your opinion are persons living in a neighbourhood with atmospheric conditions conducive to diseases of the respiratory organs made still more liable to them by the prevalence of this dust?—Yes.

2881. In epidemic pneumonia, is not contagion under-

stood to operate very largely?—Yes; Dr. Ballard attributes it to that.

2882. And the opinion of medical men from that time onwards has been in favour of spread by contagion, has not it?—Yes, when the outbreak in 1899 and 1900 was excessive, I got into communication with Dr. Fullerton, the bacteriologist of the Middlesex Hospital, who made certain investigations proving this.

2883-4. Generally speaking, would your experience be that something highly suggestive of contagion was at work in these pneumonia epidemics?—Yes, I think there are distinctly two types of pneumonia in Middlesbrough.

2885. Would you not draw a distinction between epidemic pneumonia and what we often call sporadic or casual pneumonia?—Yes.

2886. So that we may put epidemic pneumonia on one side, may we not?—Yes.

2887. Then, do you think sporadic pneumonia is higher in Middlesbrough than it is, say, in Saltburn, Redcar, Whitby, or anywhere along that coast?—Yes, I think so.

2888. Speaking generally, can you give the Committee any information on the matter from the bacteriological point of view?—In the epidemic pneumonia—referring to the epidemic which occurred under my own observation in 1899 and 1900—Dr. Fullerton (and Dr. Klein also confirmed him) made bacteriological examinations of material which I sent to him, and reported that the bacillus present in the specimens of lung sent to him proved to be identical in every way with what is recognised as bacillus colicommunis.

2889. From what cases was the sputum taken?—Pneumonia cases.

2890. In the epidemic form?—At that period it was all epidemic form.

2890*. Then have returned to the epidemic form?—Yes, at that time there seemed to be a wave of pneumonia of one type, which attacked all the town. Dr. Fullerton confirmed his examination by various experiments; but, unfortunately, from a scientific point of view, just when we were getting some reliable knowledge, the epidemic seemed suddenly to stop. That type of disease has not appeared since 1900, and we have had the ordinary type since.

2891. On the subject of tuberculosis; is the prevalence of tuberculosis high, or low, or medium?—It is not high at all, and has not increased in proportion with the population. It has remained stationary all the years I have been there.

2892. Speaking from your experience generally, are you prepared to recognise that there is a certain kind of phthisis, the so-called fibrous, which, in the first instance, may not be tuberculous, but dependent upon the inhalation of irritant particles—as in miners' phthisis, for example; and, although it may be complicated with tubercle afterwards, is a somewhat different process, so that by autopsy we can distinguish such cases?—Yes.

2893. Do you think that kind of phthisis which is originally fibrous is prevalent in your district?—No, it is not prevalent. I occasionally receive returns, but they are very rare, of deaths from fibroid phthisis. I do not think, from the returns, they number more than two or three in a year.

2894. And the phthisis which is primarily tuberculous is generally an independent affection unconnected with any previous preparation by dust?—Yes, so far as the death returns show.

2895. (Dr. Legge.) Do the Census returns give the population of basic slag workers in the district?—I think not. As far as I remember, a good many of these men are classed as labourers, although they are working in connection with the slag mills.

2896. In the Registrar's certificate of death you would not get the words "basic slag worker"?—No.

2897. So that a number of cases of pneumonia might occur among the basic slag workers?—Possibly, and we are dependent on the statement of the men work-

ing, and the manager of the works, with regard to the truth of these statistics.

2898. You had two six monthly periods, I understand, in which pneumonia was a notifiable disease?—Yes, but we then only get the word "labourer" in the certificate.

2899. But you followed up every case?—Yes, every case was investigated, and of the 287 cases notified I do not find any of them to have occurred in men engaged at the slag mill.

2900. Their employment was known, I suppose?—Yes, and the lists of employment are given in my reports for 1899 and 1900; but those of course were only cases which were notified; I have no reason for supposing they were all the cases which occurred. It was an unsatisfactory result, because it was a purely voluntary notification, and there was no insistence on the cases being notified. I am quite sure we did not get probably more than half the cases at the time, judging from the deaths which were being certified.

2901. Can you give comparative figures for pneumonia in Middlesbrough and the country generally?—I am afraid not from memory. The death rate of the cases we investigated was 36 and 37 per 100 during the years 1899 and 1900. The mortality from pneumonia in Middlesbrough during the past five years averaged 3·2 per 1,000 population.

2902. (Chairman): You quoted some statements that had been made to you by the foreman at these basic slag works. Had he anything to say with regard to the slag cough?—No, he did not say anything about that to me.

2903. Had he any further facts dealing with this subject which he stated to you besides those you have already stated to us?—He stated that many of the men had had pneumonia at one time or other, but none of them lately; and he also said, as far as my memory serves me, that the men who were most frequently ill were the young hands just brought on, and these young hands were the men employed by the works, not by him.

2904. What would their illnesses be?—The slag cough I take it.

2905. So that when a man begins to work in a slag mill he is more susceptible to the cough, is he?—Yes, and he afterwards gets immune to it. I have a man now in hospital, sent in as a case of enteric fever. I did not know he had worked in a slag mill at all until some time after I had got notice of this inquiry. I examined his lungs carefully on admission and came to the conclusion that he was not an enteric at all, but was suffering from a type of pneumonia which we rather frequently have. Afterwards I chanced to ask him where he worked, and he told me he worked at the North Eastern Steel Works, in the slag mill. Then I questioned him rather closely about the slag mill, and he gave me an account of an illness which he attributed to catching cold, and he also gave me the name of another man who had been ill and died, from pneumonia this year, which case I traced to the North Riding Infirmary and obtained the particulars of. He also said the men who perhaps got the cough more than others were the men who loaded the stuff, not the men engaged upon it in the mill and the warehouse, but who loaded the stuff either into vans, which went round to the ships in the docks or to the ships at their own wharves.

2906. Can the dust which is prevalent in Middlesbrough, and of which you have spoken, be regarded as the result of combustion to any extent?—It is the result of combustion under forced draught.

2907. Does it emerge from the chimneys and escape from the blast furnaces?—Yes.

2908. And therefore would be just as much prevalent in the air of the town as in the works from which it came, would it?—Yes, quite.

2909. That would not be quite the case to an equal extent with regard to the dust in a slag mill, would it?—No, I do not think a large amount of dust from the slag mill escapes into the air. The slag dust is very heavy. The quantity is nothing as compared with the other dust. My annual reports for the years 1899 and 1900 deal with pneumonia.

Mr. C. V.
Dingle, M.D.
6 Dec. 1906.

ELEVENTH DAY.

Friday, 7th December 1906.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).Mr. HENRY CUNYNGHAME, C.B.
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Mr. J. S. HALDANE, M.D., F.R.S., called in and examined.

Mr. J. S.
Haldane,
M.D., F.R.S.

7 Dec. 1906.

2910. (*Chairman*.) With regard to the question of carbonic oxide poisoning, have you had experience of several cases?—Yes, a number of cases.

2911. How have they arisen?—I have seen a large number of fatal cases, and non-fatal cases too, in connection with colliery explosions, and fires both above ground and in mines, and poisoning by ordinary lighting gas, by the gases formed by blasting in mines, by the products of combustion from internal combustion engines, including petrol engines in submarines.

2912. Is the poisoning in those cases sudden or gradual?—It all depends on the percentage of carbonic oxide in the air. It may take a few minutes, or it may take a couple of hours before severe symptoms appear.

2913. Do you never get a case of a man who is gradually poisoned, the poisoning extending over a period of days, or weeks, or months?—No; I have never seen any such case.

2914. Are these poisonings usually due to some explosion, or fire, or defective apparatus?—Yes, certainly.

2915. Are they not due to the men working continuously in an atmosphere vitiated by this gas?—No, not in my experience. The symptoms are fairly acute at the time, though I have no doubt that a man who was repeatedly exposed to a moderate percentage, sufficient to produce slight symptoms each day, would suffer in the end in health.

2916. What class of workers would be subject to conditions of that kind?—I think a very large class of all sorts of workers might be affected by the products of combustion from engines and from gas used in internal combustion engines, smoke, and so on.

2917. Have you come across in your experience any cases of men who have become ill by working in an atmosphere vitiated by carbonic acid gas during a period of weeks or months?—No, I have not come across any such case that I can remember.

2918. On the underground railways in London, before electrification was introduced, was the atmosphere there vitiated by carbonic oxide?—Yes, there was always carbonic oxide present in the air in appreciable quantities. There was about one volume of carbonic oxide for every twelve of carbonic acid gas, and frequently there were 50 or 60 or 70 volumes of carbonic acid gas in the air per 10,000.

2919. I think you were a member of the Departmental Committee on the Ventilation of Railways?—Yes.

2920. Did you make a careful analysis of the air in that connection?—Yes; I analysed the air myself.

2921. Did you find that there was any gradual poisoning among the men employed on the railway?—No, we could get no evidence of it. We went into the matter very carefully, and examined a number of the men employed on the railway personally, and questioned them on the subject. We also went into the statistics of their benefit societies, and found that their health was extremely good.

2922. Do I understand your view to be that, while it is possible men might suffer from gradual poisoning, extending over a prolonged period, through working in

an atmosphere vitiated with C.O. gas, as a matter of fact that is not known to occur?—I think we may say that it is not known to occur unless the amount of carbonic oxide is sufficient at the time to produce distinct symptoms.

2923. With regard to the cases which are known of what I may call sudden poisoning, are those cases really in the nature of accidents?—I should class them as accidents. There is one form of poisoning which is sometimes called carbonic oxide-poisoning, that is poisoning by nickel carbonyl. There a man may gradually absorb sufficient of the poison to cause his death after a few days.

2924. What is nickel carbonyl?—That is the gas used in the Mond process for separating the nickel.

2925. The carbonic oxide gas is a factor, is it not, in explosions in mines?—Yes, it is the cause of death in nearly all the cases of men killed in mine explosions.

2926. That, of course, is obviously accident, is it not?—Yes.

2927. And similarly all the other cases of sudden poisoning by this gas should be classed as accidents, I suppose?—I think so.

2928. Therefore are not they really outside the purview of this Committee?—I think so.

2929. With regard to nickel carbonyl; in what industries does the poisoning, if ever, occur?—That occurs in the separation of nickel from its ores by the Mond process. The nickel is taken up in a gaseous form by the carbonic oxide, and deposited as pure nickel when the temperature of the gas is raised at the other end of the pipe.

2930. Is the poisoning in that case more gradual than in the case of carbonic oxide poisoning?—Yes, the evidence from cases which have been observed, is that a man has died perhaps some days after ceasing to work. The poisoning, I think, is undoubtedly due to the metal nickel and not to the carbonic oxide.

2931. Is this poisoning of a gradual nature? Would it be possible for a man on the first day that he worked in these works to get poisoned, or would it be necessary for him to have been employed some time and gradually have got impregnated, so to speak?—I do not think the evidence is sufficient to enable one to say; but there seems to be no difficulty in recognising these cases. Only a very few cases, three or four I think, have been recorded, and very great care is now taken to prevent that form of poisoning.

2932. Can it be diagnosed with certainty?—I think it can be diagnosed from the circumstances. The first case, of course, was a great surprise. The very dangerous properties of the gas were not realised at first.

2933. Do you think that is or is not in the nature of an accident?—I should class it as an accident.

2934. Would you say it was due to some defect in the apparatus?—Yes, certainly—a leaky pipe.

2935. Would it arise in the normal course of employment as lead poisoning, for instance, might arise?—I think it is hard to draw the line. I think you may say that all lead poisoning is due to some defect in the process or the method of manipulating the material.

It is quite possible to work with the utmost safety in lead, so long as suitable precautions are taken, and the same thing applies to nickel carbonyl.

2936. (*Professor Allbutt.*) There is very little difference between the slow accumulation of a gas acting over a long time, and escape from a leaky pipe, I suppose?—The nickel carbonyl symptoms do not come on for several days after a man has ceased to work. He gets worse and worse during these days, and may get very bad after three or four days, and die unexpectedly.

2937. (*Mr. Cunynghame.*) Your view, I take it, to sum it up, is that, so far as carbonic oxide is concerned, the compensation to the workman would come in under the head of accident, and it is not necessary to go further than that?—I think so, on the clear understanding that carbonic oxide may in exceptional cases permanently disable a man.

2938. An accident might permanently disable him, but it would be generally expected, would it not, that a given case of carbonic oxide poisoning could be made out under the head of accident?—Yes, a clear case, I should think.

2939. Then as to nickel carbonyl, may I take it, in the majority of cases, at all events, that the poisoning would come under the head of "accident" too?—I think so.

2940. Is it possible that nickel carbonyl might produce a gradual illness of the nature of a disease, and which could not be called an accident, or may I take it that you think there is no evidence of that at present?—No, there have been so very few cases of it, and the company which uses the process has taken such very great care in investigating it and preventing it.

2941. So that it may be considered as not proven, at all events, at present?—I think so.

2942. (*Professor Allbutt.*) I suppose an accident may be defined as an occurrence on a certain date and at a certain place?—Yes. I think that would apply to cases of carbonic oxide poisoning, but I am not sure. I think probably the effects of nickel carbonyl poisoning are cumulative over several days. The probability is if a man absorbs a small amount of nickel carbonyl for several days in succession the effects ultimately produced might be fatal.

2943. Does such a slow exposure to the poison actually occur in fact?—I am afraid very little is known as to that. What I said was based only on the *a priori* probability that nickel is a substance which is very likely to be absorbed in some quantities, to accumulate in the tissues, and gradually produce effects just like lead poisoning. The process is that carbonic oxide is passed over the nickel ore at a certain temperature, and it combines with the nickel as carbonyl, which is a volatile substance. That is carried along a pipe and heated up when the compound is dissociated.

2944. (*Mr. Cunynghame.*) Is it used for plating goods?—It is used for separating the nickel, but not for plating, as far as I know.

2945. (*Professor Allbutt.*) I see you state in the précis of your evidence that "It is seldom that non-fatal cases of carbonic oxide poisoning are diagnosed from an examination of the blood, since carbonic oxide rapidly escapes from the blood when fresh air is breathed." That is a rather more encouraging view than physiologists have sometimes taken, is it not?—Yes, it is usually nearly all away within three or four hours.

2946. It has been alleged, has not it, that it clings pertinaciously to the blood?—Yes, certainly; there was a very exaggerated idea as to the intensity with which it clings to the blood.

2947. Then you go on to say that "Repeated poisoning with carbonic oxide would doubtless tell on a man's general health, but I have never had any opportunity of observing such a case." Is "doubtless" an adverb which you would like to withdraw?—I think "probably" would be better.

2948. Then your précis proceeds, "In other cases there are symptoms of dilatation of the heart, and these symptoms may also last for a long time." This, I think, is a very important matter, and I should like you to tell us what you know about it?—I have observed cases in which a man, after having been partially poisoned by carbonic oxide, has had for weeks and months symptoms similar to those of heart disease.

2949. Nevertheless, would it still belong to the category of accidents, do you think?—I think so, because it is distinctly attributable to a certain exposure. I think these cases recover completely.

2950. But whether they do or not, you consider it part of the consequences of an accident, do you?—Yes; and similarly in cases where mental derangement has followed.

2951. (*Dr. Legge.*) With regard to nickel carbonyl, do you know in how many factories the process is used?—I am afraid not. I only know of its being used by the Mond Company.

2952. Have you been over the factory?—No, I have not.

2953. Do you know whether the accidents occur singly or in groups in connection with it?—I think the cases up to now have occurred singly as far as I remember.

2954. Do you know whether it was due to the breakdown of automatic plant or not. Did the poisoning only occur when hand labour was adopted on the breakdown of automatic machinery?—I am afraid I do not know the details.

2955. Do you know whether any case has been reported within the last three years?—I have heard of no cases.

2956. Would you have been likely to have heard of them if such cases had occurred?—I think I should.

2957. You mentioned the care the firm took. Do you know what the precautions which are taken are?—I believe they have taken very great care to thoroughly ventilate any pipe or joint which might possibly leak.

2958. By mechanical means?—I believe so.

2959. With regard to carbonic oxide, is the number of gas plants, to your knowledge, increasing in factories?—Very largely, I should say.

2960. Is it in connection with such plants that one might expect gradual poisoning to take place?—I think so, if there is a leakage of that gas, or a leakage of the products of combustion.

2961. So that one has to apprehend a possible increase in the number of carbonic oxide poisoning cases?—I think so. I think it must be regarded as a very common occurrence.

2962. Would you be likely to be called in in cases where the poisoning is very gradual, and where the symptoms are cumulative?—I think I should be very likely to hear of cases of that sort, at any rate in connection with mines, or in connection with submarines, for instance. There has been great trouble with carbonic oxide in connection with submarines.

2963. Have you heard of cases of paralysis developed as the result of carbonic oxide poisoning not showing itself for some time?—I have never heard of any cases of paralysis developing as the result of very gradual carbonic oxide poisoning.

2964. If you knew that such cases had been recorded by, for instance, Dr. Judson Bury, of the Royal Infirmary, Manchester, would you accept the opinion expressed by him as to the causation of paralysis?—I am afraid I have not seen these cases, and I do not know what the evidence is on which he bases his opinion.

2965. If there were such cases as that form of paralysis, would it be sufficient then to record it merely as the result of an accident?—I do not think it would. Carbonic oxide must act as a predisposing cause in these cases if they exist.

2966. It would make assurance doubly sure, would it not, if carbonic oxide were included in the schedule? Do you see any objection to include it in the schedule?—I see no objection, but I cannot say from my own personal experience that I see any special reason for including it.

2967. Do you say with regard to what is described in books as chronic carbonic oxide poisoning there is not sufficient evidence to enable you to say whether you agree with the statements or not?—The statements which I have seen in books on the subject seem to me to be based on very insufficient evidence.

2968. I see it is stated by Dr. Oliver in Professor Clifford Allbutt's "System of Medicine" that 100 cubic centimetres of nickel carbonyl will give off 73.6 litres of carbon monoxide. This circumstance and the post-mortem appearances just mentioned lend considerable weight to the opinion that in nickel carbonyl poisoning

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the symptoms are due to carbon monoxide. On this point the last word has not yet been spoken." May I take it that you disagree with that?—Absolutely. I am perfectly sure it is not so. I have experimented with it myself.

2969. Can you describe what the peculiar symptoms which the men suffer from are, and what is the main characteristic?—I am afraid I have not the details of cases in my head just now, and I should not like to say; but they are nervous symptoms.

2970. Are they respiratory at all?—Yes; I believe there are respiratory symptoms towards the end, but the characteristic feature of them has been that the symptoms have not developed to a serious extent—at any rate, until perhaps days after the man has left his work, whereas in the case of carbonic oxide poisoning the symptoms tend to decrease after the poisoning.

2971. When you say that the symptoms tend to increase, do you refer to the cases which prove fatal?—Yes.

2972. You do not say that all nickel carbonyl poisoning is fatal?—No; but I am convinced myself that it is an extremely poisonous substance from experiments on animals, and when severe symptoms were produced in the animals there was no change in the blood indicating absorption of a sufficient amount of carbonic oxide to produce any symptoms at all. There was very little carbonic oxide in the blood, so little that it had nothing to do with the symptoms.

2973. (Professor Allbutt.) You state in your *précis* of evidence: "I do not think, however, that the repeated breathing, day after day, of a very small percentage, not sufficient to produce symptoms on any one day, has been shown to cause definite harm, or would be likely to do so." Is that your opinion?—Yes, it is.

2974. (Chairman.) We will turn now to caisson disease. Have you had very considerable experience of that?—I have gone into the matter very carefully recently for the Admiralty in connection with diving. I cannot say I have seen many cases of caisson disease, but I have investigated it experimentally along with Dr. Boycott, and have gone into the records of cases of all sorts.

2975. Do you agree with the theory that the cause of this illness is bubbles of nitrogen gas in the blood and tissues?—Yes, certainly.

2976. This also might possibly be considered to be accidental, I suppose?—I think so.

2977. Because if decompression is gradual then the symptoms need never occur?—They need never occur.

2978. And can never occur?—If the decompression is very much more gradual than in common practice.

2979. Can you always say that a man has contracted this illness at a given time?—Yes.

2980. Is there no element of graduality in it?—No, I think not.

2981. A man, I suppose, might be just as liable to contract the disease the first day he went down in a caisson as if he had been doing it for 10 years?—I think so, but some people do not think the same about it.

2982. What is the other view?—The other view is that a man does, to a certain extent, get used to it. I do not think there is any satisfactory evidence of this.

2983. (Professor Allbutt.) That would be affirmative as far as it went, I suppose?—Yes, I suppose so.

2984. (Chairman.) Do the symptoms appear immediately the man comes into the ordinary atmosphere?—Usually within half an hour, but sometimes it is several hours before the symptoms appear.

2985. Have a number of fatal cases occurred?—Yes; and a number of cases of paralysis, which is sometimes permanent, but which usually passes off. There is, however, a graduation of cases.

2986. Are there cases of blindness and all kinds of other symptoms?—Yes, occasional cases.

2987. Could it be stated with certainty that those symptoms were due to caisson disease if you knew the man had been working in that employment?—I think so. The only difficulty is when a man is taken ill with some other illness about the time or during the time when he is working in a caisson. Supposing he gets an attack of some other illness, it is occasionally put down to caisson disease, and perhaps there is then a difficulty in determining whether the working in the

compressed air has anything to do with the illness or not. That, however, is a difficulty which I think might occur in any medical case. It is the sort of difficulty which is common in medicine.

2988. Are the workers in caissons liable to C.O. poisoning?—Occasionally it happens. If there is a fire in the caisson, or in a tunnel which is being constructed with the help of compressed air, it is extremely dangerous. Things burn with great rapidity in compressed air, and a very small fire might easily have extremely bad effects, and occasionally cases of poisoning by smoke—that is to say, by carbonic oxide, have occurred.

2989. Would the cause of that always be distinguishable?—Those cases would be distinguishable, but I think it is very probable that the symptoms of caisson disease have occasionally been confounded with those of carbonic oxide, due to imperfect combustion in the compressed air and insufficient ventilation.

2990. But after all no great harm would be done supposing a man were diagnosed as suffering from caisson disease, and he had been really suffering from carbonic oxide poisoning, when, as a matter of fact, either would be the result of his employment?—No.

2991. Are the workers in compressed air very liable to other complaints, such as injury to the ear, which are of a different nature from those illnesses, and injuries caused by the bubbles in the body?—Yes; those injuries are due to mechanical pressure.

2992. What are the symptoms?—Pain in the ear, or deafness.

2993. Does that incapacitate a man from working?—He may have got inflammation of the ear, which is occasionally fatal when it extends to the brain.

2994. Which is distinctly due to his employment?—Yes.

2995. That, of course, is not, is it, in the nature of an accident?—I should say it was myself.

2996. Would it be due to an accidental excess of pressure, or anything of that kind?—No, but it is very often due to the man going into the compressed air, and having, say, a cold in the head which produces slight catarrh. If the tube between the throat and the ear is blocked, the man cannot stand the compressed air.

2997. Then would the accident consist in the man being subject to compressed air at the time the Eustachian tube was blocked?—Yes; or a man who is not accustomed to going into the compressed air, if he goes into it for the first time, is liable to injury to the ears, because he does not know how to open his Eustachian tubes.

2998. Suppose these diseases were scheduled under the name of caisson disease, would that be completely understood by a court of law, which had to interpret the Statute, or would such a term as "compressed air illness" be better, do you think?—I do not think it much matters myself.

2999. Might not it be held that a man who, for instance, suffered when he was engaged in conducting operations as a diver, and not in a caisson, could hardly be said to be suffering from caisson disease?—The term is applied to illness in divers also.

3000. Would it cover the injury to the ear which you have been discussing?—I think that is perhaps rather a doubtful point. You see, ear injuries are due to a different cause from the others.

3001. By caisson disease would you mean any symptoms that arose from nitrogen bubbles in the blood or tissues due to working in compressed air?—I think many writers would also include the ear troubles—they are always described along with the others. It is a doubtful point, and perhaps "compressed air illness" would be a more comprehensive term, and would leave no doubt.

3002. And would certainly, would it not, cover the ear troubles?—I think so.

3003. How could the ear troubles be shortly described, supposing we wished to bring them into the schedule specifically?—I should say as injury to the ears.

3004. Due to working in compressed air?—Yes, due to compressed air.

3005. (Mr. Cunynghame.) The answers you have given with regard to injury to the ears rather seemed

to me to lead to putting that down as an accident, too. Is that so or not? I mean by an accident a thing occurring on one occasion, and not the result of a great many operations. Would the injury to the ear be the result of a man on one occasion going into a caisson and having something happen to him which was rather unexpected, or might it be the result of going in 20 times?—No, certainly not; it would be the result of one action. As a general rule, a man who goes into compressed air gets to know how to manage his ears and escapes the troubles.

3006. Then your view is really, is it, that it is an accident if it occurs on one occasion?—It is an accident, but very often complicated by secondary infection. If the injured part of the ear gets secondarily infected, the results may be very serious.

3007. (Chairman.) In the same way as a man might cut his hand, which is an accident, and might get blood poisoning afterwards?—Yes; that would be held to be the result of the accident.

3008. If the Committee were to treat as an accident a thing that occurs on some definite occasion, even though the results it produces may arise gradually afterwards, should you say that injury to the ears was an accident or a disease?—An accident, I think.

3009. So that probably it would be covered by the accident clause in the Act already, you think?—I think so.

3010. (Professor Allbutt.) From the medical point of view might there be in one case injury on a certain day and time, and in another what one might call an over-stress of the parts of the ear, lasting very many days or weeks or months. I mean, do you think the injury to the ear is brought about from strain on one particular occasion when the ear was stressed beyond its capacity for immediate repair, or do you think it is, or may be, an effect of cumulative stresses?—I think the symptoms are due to exposure on one particular day. Repeated exposure has no bad effect on a man as far as is known. I think there is nothing in going into the pressure, because we have had divers in experimenting going to a pressure of 90 lbs. to the square inch in two minutes, and coming up again most of the way in about two minutes, and they felt nothing.

3011. (Dr. Legge.) In your experience is this kind of work ever done except under medical supervision?—Certainly it is done without special medical supervision. I think in this country it is always done with care, but so far as I know it is done in small engineering undertakings without special medical supervision.

3012. Supposing a man had perforation of the drum of his ear, would that indicate he had worked in such conditions?—No, I think he would be immune, because the air would go straight in.

3013. But it would be quite possible for the man, if he had a perforated membrane, not to be fully aware of it, I suppose, and to discover the fact subsequently?—Yes.

3014. So that you would be open to a wrong diagnosis occasionally?—Do you mean a perforation due to the work.

3015. No. Supposing he had a perforation of the membrane beforehand, and he realised subsequently that he had it, might not he claim compensation then for a perforation which pre-existed?—Yes, he might.

3016. But where that work was done under medical supervision I suppose there would always be an examination made of the ear?—Yes, that would be one advantage of medical supervision from the employer's point of view.

3017. Have you come across medical men who have had charge of these workers?—I have in one or two cases—in the case of the Rotherhithe Tunnel.

3018. Would it be desirable to appoint a man as medical referee who had had experience of such work, or are the symptoms such that any medical man could decide upon them?—I think it would be advisable to have some special knowledge of this caisson disease—or, at any rate, of the literature of it. I think any capable medical man who had read the literature of it would have no difficulty, but most medical men have not specially studied it.

3019. Have you had any experience of deafness in other industries—boiler-makers are said to suffer largely from it?—I have heard of it, but I have never personally investigated those forms of deafness.

3020. (Chairman.) I will now turn to the subject of fibrosis of the lungs. Have you investigated this disease for various purposes?—For miners' phthisis, yes.

3021. Among what classes of men?—Chiefly among miners, but also to a certain extent among pottery workers.

3022. (Mr. Cunynghame.) Do you mean coal miners?—No; there is practically none of it among coal miners. I refer to metalliferous miners, especially in Cornwall.

3023. (Chairman.) In what other employment have you given attention to the disease?—To a certain extent, in connection with pottery works. I have gone into the statistics, at any rate, as far as it was possible to do so. I have investigated many occupations where I could get no evidence of fibrosis being produced by the dust.

3024. Affections of the lungs may be tubercular or fibroid, or both, I suppose?—Yes, I think so.

3025. Fibrosis of the lungs is due to the inhalation of dust, is it?—It is said to be so. I do not like to go any further than that, either positively or negatively.

3026. Do you think tuberculosis may also be due to dust?—Yes. My view is that the inhalation of dust renders the lungs enormously susceptible to the attack of the tubercle bacillus, and I think that has been the main factor in cases of phthisis due to dusty occupations which I have seen.

3027. Can you, from the symptoms of a man, with certainty tell whether the lung disease from which he is suffering is due to the inhalation of dust or is analogous to the lung diseases prevalent in the general population?—I do not think, honestly, that you can with certainty. There are certain general differences, I should say, in the symptoms, but if you took a miner who is suffering from miners' phthisis, and showed him to a general practitioner who was not particularly familiar with miners' phthisis, I think he would put him down as an ordinary case of phthisis.

3028. But suppose you had a specialist, a man who was exceedingly skilled in lung diseases, would he be able to say, supposing he had 10 cases in a hospital of lung disease, that A, B, and C were suffering from diseases due to their employment, and the remainder were suffering from diseases not due to their employment?—I do not think he would in any individual case have sufficient grounds to go on to be justified in saying positively from the symptoms alone that a case of phthisis is due to dust inhalation.

3029. Supposing you had in a Cornish mining village half a dozen men whom you knew were engaged in mining, and who had, let us say, returned from the Transvaal suffering from a lung disease, would you be able to say with certainty whether those six men, all, or what number of them, were suffering from a disease due to their employment?—I should say you could tell that with very great probability. A man who had had experience of this disease could tell with very great probability, but I think he would be at a loss if he saw the case, and was not told that the man was a miner, and not told anything about his history. He would be at a loss to distinguish, at any rate, the great majority of the symptoms. Some of them, I must say, have distinguishing symptoms which are different from those in other cases of phthisis, but many of them have not.

3030. How would you describe the cases which have the distinguishing symptoms? What would you call those cases?—I should say in cases where the amount of shortness of breath is very much in excess of the symptoms of consolidation of the lung.

3031. Is there any term which would cover those cases and exclude those without distinctive symptoms—"miners' phthisis," for example, or "potters' phthisis"?—No. I think miners' phthisis and potters' phthisis must be taken to include the whole of the cases of phthisis which these men suffer from.

3032. Although they may be suffering in exactly the same way, and from exactly the same cause as their relations who are not employed in the industry at all?—Yes. I think there must be a few cases among miners and potters which would have happened anyhow, whatever their employment, and it is almost impossible to distinguish those cases.

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3033. But they are comparatively very few, are they?—Certainly, very few in comparison to the large number of cases which occur amongst metalliferous miners.

3034. If there were a dozen miners suffering from complaints of this nature, is it probable that 10 or 11 of them would be suffering in consequence of their employment? Would that be about the proportion you would suggest?—Yes; and one can judge very well from the statistics on the subject. I refer in my *précis* of evidence to Table 16, embodied in the report on the health of Cornish miners (Parliamentary Paper Cd. 2091, 1905), which contains the causes of death of a number of miners who had worked with rock-drills, and whose names were found in the Death Register at Camborne.

3035. Did they work with rock-drills in England or in the Transvaal?—Any man who at any time worked with the rock-drill is on this list. There are 142 men who had worked rock-drills, and of those men 133 had died from lung disease, and nine from all other causes put together, including accident. The average age at death of these men was about 37.

3036. Of those who died of lung disease, how many should you think had the characteristic symptoms indicating that the disease was due to the inhalation of dust?—I should not like to give any estimate on that point. The number of cases I have seen is limited, but I should doubt whether more than 10 per cent. of those presented such characteristic symptoms as would enable a doctor who knew the disease thoroughly to distinguish it from other forms of phthisis.

3037. And yet you think, do you, that the great majority of them suffered from the disease owing to having been engaged in that occupation?—I think there is not the slightest doubt, from the statistics. You see, for instance, with regard to the men who had worked in the Transvaal, out of 49 deaths 48 occurred from lung disease. These men probably were the men most exposed to the dust.

3038. Do you ever get fibrosis of the lung among people who are not engaged in occupations involving the inhalation of dust?—One gets it in the case of syphilis, for instance. It is one of the chronic stages following syphilitic infection. But it would be always possible to distinguish any of these cases by post-mortem examination of the lungs. The lungs of the miner are unmistakable.

3039. Then by post-mortem could you always say that a man's lung disease had been due to his occupation, or not as the case might be?—You could say—at any rate, with very great probability—that the disease had not been due to his occupation. If on examining the lungs of a man who was supposed to have had miners' phthisis you found no stone-dust in the lung, I think you could say very positively that his disease had not been due to his occupation.

3040. You said, did not you, that a miner's lung is unmistakable?—Yes, the amount of dust in it being so great.

3041. If you found these specific miners' symptoms in the lung on post-mortem, would you be entitled to say he had died in consequence of an industrial disease?—I think so. I have seen cases of that sort. In one case where we made a post-mortem examination, a man had been a farmer for 10 or 15 years. He was an old miner, he died of phthisis, and the lungs were full of stone-dust.

3042. Do you think that man would not have died of phthisis if he had not worked as a miner previously?—One could say with almost absolute certainty that he would not.

3043. Is this disease a disease of very gradual growth?—It is of very gradual growth in the majority of cases; that is to say, if the amount of dust inhaled is small, it is of very gradual growth, and it may take 40 years practically before symptoms occur; but if the amount of dust inhaled is large, as in the case of rock-drill men before the present regulations were made, then death might occur after two years' work.

3044. Does what you have said with regard to miners' phthisis apply also to potters' phthisis?—I think so, as far as I can judge. I have not the same knowledge of potters' phthisis as of miners' phthisis, but there is a very great deal of phthisis, and apparently it exists still, as far as one can judge by the register at Stoke and in the neighbourhood of Stoke. There appear to be still a great many cases of phthisis among pottery

employees, just the same sort of cases as exist among metalliferous miners, excluding rock-drill men, who are more subject to the disease. It attacks the older men, or at any rate, it hardly shows itself before the age of 40, but then it grows rapidly.

3045. Is there any possibility of saying how large a proportion of cases is caused by the disease which shows the characteristic symptoms?—I am afraid I have not sufficient experience of potters' phthisis to say definitely. I should not expect you would find any more characteristic symptoms in them than in the case of miners.

3046. (Mr. Cunynghame.) Is your view that phthisis clearly is a disease, and not an accident?—Yes, it is a disease, because it is the result of a long period of exposure to the causes.

3047. In a case of death, you have said that there would not be much practical difficulty in assigning the death to its right cause?—I think not.

3048. Would the sputum be an indication; would you expect to find any dust in that?—When the lung is breaking down actually, I believe you do. I have never observed it myself, but I have heard of it.

3049. It would not be sufficient to be a critical test then, would it?—I think it would be of very little use practically.

3050. With regard to the nature of the different sorts of dust that cause this disease; in the first place it is plain, is not it, that there are some dusts which are innocuous?—I think so, or at any rate relatively innocuous.

3051. Or may be treated as innocuous?—Yes.

3052. For instance, such things as flour would be probably innocuous?—I think so, though curiously I believe there is some evidence of phthisis being produced by silicious seeds.

3053. Are you alluding to the hard American wheat, where the husk may be silicious?—Yes.

3054. But, as a general rule, soft dust, such as wood dust, and things of that sort, are not those which cause this disease, are they?—No. Cement-dust, for instance, is a case in point. As far as I have been able to discover myself, or hear from others, it has no effect.

3055. Does the same thing apply as to chalk-dust?—Chalk-dust is something of the same sort of thing.

3056. It would not be likely to cause disease, would it?—Not so far as is known, and I have often enquired into the effects of these sorts of dusts.

3057. Coal-dust is innocuous, or is believed to be innocuous, too, is not it?—Yes, or relatively innocuous.

3058. I suppose the dusts we may take as dangerous ones are ganister, which is powdered silica?—Yes, Dr. Legge has furnished very conclusive figures on that subject, I think.

3059. Ganister-dust would be distinctly dangerous, I suppose?—Yes.

3060. The silica in which the finer kinds of porcelain are embedded will again be a dangerous dust, I suppose?—Yes.

3061. As to steel, that, I suppose, would be a dangerous dust?—I think so; I think there is very little doubt about that. Of course, steel-dust is usually mixed with emery. But there are cases of phthisis which are apparently due to steel from which emery-dust is excluded. I think the file-makers' phthisis, for instance, is probably a case in point. There there is no non-metallic dust breathed.

3062. But there will be lead there, will not there?—It is full of steel; in striking the files a lot of steel is disengaged; and if you take the dust found in a file-makers' workshop and examine it with a magnet, you will find it is full of steel.

3063. Are you able to say whether when the steel comes off the grindstone in sparks, it gets oxidised and made innocuous, or not?—I have often supposed that the sparks which burn must become innocuous. I do not know. It is only a matter of conjecture, but I think it is very likely.

3064. I suppose that those kinds of millstone grit, that are used in grinding steel, will be silicious, and probably dangerous?—Yes.

3065. With regard to emery and corundum, do you think the Committee should include those in the Schedule? Emery, of course, is a different thing from

silica, and is a form of ruby, is not it?—I am not sure what its chemical composition is.

3066. We have definite evidence about emery and corundum and other grinding materials as well as millstone grit; have you seen that evidence?—I cannot remember any definite evidence, but I have no doubt that it would set up irritation, which would produce phthisis.

3067. Have you seen the process of grinding?—Yes, many grinding processes.

3068. Am I right in saying that they may be divided into three great groups—the wet, the moist, and the dry grinding?—Yes.

3069. By wet grinding, I mean when there is a volume of water poured on the grindstone, as is done in many modern works. Then there is the moist grinding, when there is an occasional bucket of water thrown on the stone, and then there is the dry grinding when there is nothing thrown on at all?—Yes.

3070. The first of those processes would appear to me, speaking without knowledge, as probably devoid of danger. Would you say so?—Yes, I should say so.

3071. Would the moist process be probably intermediate, depending on the extent to which the stone was wet?—Yes.

3072. And the dry grinding would probably disengage a quantity of dust which, if not removed effectually, would very likely be dangerous?—Yes.

3073. I believe there are a large number of stones, are not there, that have to be used dry because the waters wears them off?—I have heard so, but I have no special knowledge on the subject.

3074. Have you any knowledge whether it would not be perfectly easy to disuse those stones altogether, and to use nothing but wet stones?—I should not like to express an opinion on that myself, because I do not know sufficient about it.

3075. As to the occupations which are subject to these dusts, first is there the metalliferous miner. In using the words "miners' phthisis" you do not mean, do you, phthisis common to all miners, but phthisis common to metalliferous miners, I take it?—Yes.

3076. Do you mean any particular class of metalliferous miner; for instance, would tin workers be subject to it?—Any miners working in tin would be subject to it.

3077. But do not some of the minerals lie in those sorts of stone which are not dangerous at all?—I think that probably is so. Ironstone, of course, is not at all dangerous.

3078. So that in using the words "metalliferous miners" we must, must we not, rather refer to miners who work in silicious rock, which is perhaps more what you intend to deal with?—Yes. I should rather put it as miners who work in metal occurring in lodes and not in strata.

3079. But the material they are engaged in getting must be of a silicious character in order to produce this disease, must it not?—I think that is in the main correct. The disease, as far as I know, is always associated with silicious rock.

3080. Taking the case of miners who are ripping roofs down—boring them and blasting them down for getting coal—they would not probably be dealing with a silicious material, would they, and though it was rock, still they would not have the disease?—I think if it was shale they were bringing down, they would probably be no danger in it, but if it was sandstone there would, and there are many cases in coal mining where they ought to take precautions.

3081. Do you mean really metalliferous miners working in silicious material? Is that the class to which you are directing our attention?—Yes, it is. Perhaps I should put it a little more generally than that, and say working in hard stone.

3082. But there might be hard stones, might not there, which are limestones?—I am not sure. A great many of the lead miners work in limestone, and lead miners are very subject to miners' phthisis.

3083. Do not you think it is the lead possibly which produces it?—No.

3084. Do you think it is due to the rock?—Lead miners never get lead poisoning practically.

3085. If it were wished to distinguish miners' disease

in some way, can you suggest what word should be used to describe the process? It is conceded, I understand, that it would not be every sort of mining in every sort of material, but that it would be necessary to limit the definition of the process in some way or other. Can you suggest a rough definition which could be used? We cannot say "every miner"; that is too wide; even "every metalliferous miner" appears to be too wide in some respects, and too narrow in others, because it would cover all sorts of dealing with rock with no silica in it, and it would not cover a coal miner, who might be engaged in silicious rock. Can you suggest any definition of words which would cover the process which you are particularly alluding to? May I suggest to you "mining in silicious material" or something of that sort? I suppose that would cover 9-10ths or 99-100ths of the whole thing really, would not it?—I am not quite sure as to what the materials are that lead miners work in, and they are certainly subject to phthisis, because there is often silica in the lode, but it is not quite clear that their symptoms are due to the particular quartz they work in.

3086. There seems to be some difficulty even there, does there not, in putting down a form of words which would describe the thing properly?—I think there is the word silicosis, for instance.

3087. May I take it that your remarks are chiefly directed to silicious material?—Yes, my experience has been in connection with silicious material. May I say that certain men employed in coal mines are very much exposed to it, such as the men employed in making stone drifts.

3088. Are you aware that in some cases the ganister men are engaged in getting both ganister and coal, which, I understand, lie right on top of one another? Would that be an illustration of what you mean?—Yes.

3089. It is most difficult with regard to those men to say whether they are coal miners or ganister miners, I understand?—Yes.

3090. (Chairman.) But it is the ganister which is responsible for the disease in coal mining, is it not?—Yes.

3091. The farmer whom you quoted as having been a miner earlier in life would not have been a coal miner, would he?—No, he was a metalliferous miner in Cornwall, who had been in South Africa and all over the world.

3092. (Mr. Cunynghame.) Among these diseases, I suppose, that due to ganister is clearly a rather bad disease?—I think so from Dr. Legge's statistics.

3093. Have you had any experience of knife and razor grinding?—I have seen it, but I have not gone into the statistics carefully.

3094. Have you had much experience in investigating the causes of disease among workers in those trades?—No.

3095. May I take it that phthisis might be expected to occur as a trade disease in a great many different occupations, in mining on the one hand and in dry grinding on the other, and so on?—Yes, there are many occupations in which it would occur.

3096. Would you say that the occupations would differ very much in this respect—that when you have a case of phthisis in one occupation you would say the great probability is that it was due to disease; on the other hand, in another occupation you would say the very great probability was that it was not due to disease?—Yes, I think that is all one could say.

3097. So that in any question of scheduling the disease there would be some cases that perhaps might clearly be scheduled, and some clearly not, and then there would be an intermediate class in which all you could do would be to study the probability?—I do not think there would be any cases in which you could exclude the influence of dust, if the man had been in the habit of inhaling dangerous dust.

3098. But if you put the disease into the schedule in some occupations, such as wet grinding, you would be putting down a disease which in nine cases out of ten was not a disease resulting from occupation, would you not?—Certainly.

3099. And the only plan is to take the question as one of great probability. In some cases you would say phthisis was most likely to occur from the occupation,

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and in others not, although there was a chance each way in every case?—Yes.

3100. What do you think, if these cases, or any selected group of them, were put into the Third Schedule, would be the difficulties, if any, in practical working? Do you think there would be difficulty in administration if you did so?—I think there would be very serious difficulties, and that it would tell very heavily against the men.

3101. Will you explain why?—What would happen I am sure in the case of the mines in Cornwall, for instance, would be that they would not employ men who had worked for a long time previously in mines, and particularly men whom they suspected of having done dangerous work abroad. There are a great many men, first-rate miners who come home to Cornwall from India, the Transvaal, and various other countries.

3102. Would they say "You men are in a condition in which phthisis is likely to break out, and then we should have to compensate you, therefore we will not employ you"?—Yes.

3103. But could not that be dealt with by saying they must take a less wage, or might not the employers run the risk of insuring them with an offer of a lower wage. Would not the difficulty possibly be met in that way?—It might be, but these men must have enough for themselves and their families to live on, and they could not afford to work for a much less wage.

3104. In the state those men were in, and if the mines were properly protected by special rules, do you mean it would be better to allow them to go and work rather than to keep them out of employment. Do I rightly represent your view?—I think it is very hard on those men to be kept out of their employment entirely; and I think it would result in their being kept out of employment, and in old miners generally being kept out of employment at other mines than the one particular mine they had worked in previously. I do not think any mine owner would dismiss a man because he was getting old, on the score of risk; they would not dismiss their own men, and would provide for them, but they would say, "We are not going to provide for the damage done to men in other mines, particularly mines abroad."

3105. Could not those objections be met if a system of insurance on a large scale were put into operation, and if men who came from abroad were told that, in consequence of their liability to this disease, the increased insurance which would have to be paid for them must be considered in their wages?—It would be a tremendously large consideration. No insurance company would take a Transvaal rock-drill man.

3106. Do you think the risk is so great as that, and that the premium would be so large?—It would be an enormous premium.

3107. Then, in fact, do you think the Transvaal is returning to us a lot of men very seriously injured?—Undoubtedly. You find Transvaal men dying in nearly every street in Camberne; or it was so a short time ago.

3108. In fact are they returning to us men who would find it additionally difficult to find work, and who would starve?—They might get something to do, I dare say, but it would not be the work which they are skilled in, and in which they could earn the best wages.

3109. That is one difficulty which you see, is it?—Yes, and I see also a great difficulty with the older Cornish miners. Supposing a man over forty stops work, or has lost his employment at one mine, and wishes to get employment at another, and forty is the age at which miners' phthisis becomes serious, I think that man would find difficulty in getting employment.

3110. In addition to those difficulties would the difficulty of diagnosis occur?—I suppose that really would have to be decided by the man's history.

3111. Though difficulties might occur, do you think they would not be so formidable as to be a bar to putting the disease into the third schedule?—I do not think so from that point of view. The difficulty would be to say what employer was responsible for the phthisis. Cornish mine owners just now, where they are taking great precautions against dust, would very much object to have the responsibility of the result of mining in other places thrown upon them.

3112. Would not that difficulty be largely met by the provision, put the other day into the Bill, of a power

on the part of the Secretary of State, to require mutual insurance schemes, the effect of which would be that if both former employer and present employer were included in one company, the difficulty would not arise because they would all contribute together?—But I see a difficulty, taking Cornwall, where a great number of mines have stopped working, or did stop working a few years ago, and a great many new ones are starting now. I think the mine owners who contributed to the insurance company would combine to keep out all the suspicious and older men.

3113. You think, do you, that there is still a difficulty which would have to be faced, namely, a danger of the older men being thrown out of employment?—Yes.

3114. And no considerations that I have been able to suggest, or others that occur to you seem to you quite to meet that difficulty. Is that so?—Yes; I think it is a difficulty which must be faced. I think the real solution of the difficulty as to miners' phthisis is a big insurance scheme to which the employers, the royalty-holders, and the miners themselves, should contribute—as in Germany—an insurance scheme which will give the men pensions if they are disabled, and really effectually provide for them and their dependants.

3115. Would some universal insurance scheme in your opinion, be best calculated to obviate the difficulty you have put before us?—Yes, I think it is particularly required in the case of an industry like metalliferous mining, which at the best is somewhat dangerous.

3116. Are you inclined to think, taking ganister, that it would do more harm than good to the men's interests to put it into the schedule?—I see the same difficulty in all the industries which this matter deals with, and in which phthisis occurs. I am very much afraid that it might injure the chances of the older men.

3117. Just at the time when the disease is most likely to break out?—Yes.

3118. (*Professor Albutt.*) You say in one sentence in your précis "that however healthy a Transvaal rock-drill man may appear to be on his return, he will probably be dead within a year or two." Such a probability would create an enormous difficulty in any scheme of insurance?—Yes.

3119. The death-rate is a heavy one?—A very heavy death-rate.

3120. Do you really mean a large majority die, sooner or later, of the disease?—If they have worked more than two or three years with the rock-drill in the Transvaal, yes. All we know about is the large majority of men who come home—practically there are hardly any left of the men who came home some three years ago.

3121. You are dealing with miners' phthisis only, and not other diseases, are you?—Miners' phthisis only, and nothing else.

3122. The mortality amongst the men who come home is enormously in excess of the normal incidence of phthisis?—Yes.

3123. If you are insuring to meet the normal incidence, it is one thing, but if you are insuring for an excessive incidence it is another thing. The difficulty is, of course, to employ an average to an individual case, is not it?—Yes, it would be impossible; one individual may have taken precautions against the dust, or may not have been exposed to it for some reason.

3124. With regard to the prejudice against older men, at what age does the disease break out?—That is shown in the statistics, in the table I have referred to. It depends entirely on the amount of dust inhaled by the men. If a man is inhaling a large quantity of dust, as a rock-drill man under the old conditions did, when there was no water, two years might be sufficient.

3125. Could you classify the work in degrees of peril?—Yes, that was very dangerous work.

3126. Then would it not be important to make subdivisions of the employment upon the basis of greater or less peril to the men?—Yes, in the case of rock-drill work, that was very dangerous; and in two or three years might be sufficient to cause death.

3127. At whatever age a man went to it?—I should say so. The rock-drill men who have died lately of phthisis have been all young men.

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3128. Might there not be two rising curves, one say between 20 and 30 years of age, and one between 45 and 55, or do you think the curves should be uniform?—It is a compound curve. The rock-drill men mostly die between 30 and 40.

3129. At what age do they generally begin the work?—It is hard to say; very often at 25, but at different times. Rock-drill work is a new kind of work, or at least the great demand for it is rather new, so that men take to it from other kinds of mining work, especially the more skilled class of men, and they get higher wages.

3130. Do you find that among women in Cornwall phthisis is very high?—No, it is very low. The death-rate among women at Camborne is extremely low; it is less than 1 per 1,000, whereas the death-rate among men is high, and the highness is due entirely to the deaths amongst miners. There is no evidence of infection, or at any rate widespread infection, sufficient to affect the statistics.

3131. However healthy a man may appear, I suppose there is a certain latent period for these cases?—Yes, I think it is probably a mere matter of chance as to when he encounters sufficient tubercular infection to light up the disease. That was the impression I formed.

3132. Would you say that there might be a dust period followed by a tuberculous period, the dust period being more latent?—Do you mean when there are only fibroid changes going on in the lungs?

3133. Speaking generally, do you think there is an initial phase of dust irritation, and then super-vention of tubercle upon that?—I think so, certainly.

3134. The difficulty is to distinguish in the individual case, I suppose?—Yes, it is very often extremely difficult to tell by examination of a man whether he has inhaled a dangerous amount of dust. You can almost tell better by the general appearance of the man, curiously, than by examination.

3135. How long might the latent period be?—It seems to me it may be months, or it may be years. Men often die of miners' phthisis who have been after their mining work farmers or something of that sort.

3136. In a case where a man leaves his employment as a miner and takes to farming, would you be able to fix the responsibility on the last employer, if, say, half-a-dozen years had elapsed?—It might be that, or it might be more. The appendix to the report shows the condensed life history of a great many miners who have died, and what I am saying now is inference drawn from this table.

3137. Would you say that where the dust is of a dangerous quality, or on the other hand where it is large in quantity, that the latent period would be shorter?—Yes, decidedly very much shorter.

3138. Would that take you so far as to say that the difficulty of discrimination chiefly arose in the acute cases, which appeared suddenly and ran their course rapidly?—I should say those cases are often easier to diagnose, or at least the individual would be almost easier to diagnose.

3139. Do you think the acute cases would be easier to diagnose?—Quite as easy as the chronic one, I should say.

3140. I thought perhaps having a latent period, which presumably was not tubercle, there might be a difficulty in distinguishing whether it was a dust case or not?—I am not sure about it.

3140*. In making any diagnosis, we must assume something like a full knowledge of the individual case. We cannot make diagnosis on imperfect information?—No.

3141. May I suggest to you then that a period of shortness of breath with a comparative absence of physical signs would be characteristic?—Comparative absence of physical signs, combined with great shortness of breath is, I think, rather characteristic.

3142. So that if one had sufficient knowledge of the stages of the disease, one would be able by some such characteristics as those to act with a certain amount of discrimination?—Yes. The doctors at Camborne know these cases well, and deal with them as cases of phthisis when I should have put them down as cases of ordinary asthma, but they know better, and that the man is dying.

3143. We all know that the means of diagnosis have

improved, and that more and more of the fibrous phthisis is found, sooner or later, to be tuberculous; but I was suggesting there might be a preliminary stage during which fibrosis might be distinguished from a secondary tuberculous condition?—I am bound to say that other observers have described the symptoms of fibrosis, but I have never observed these cases myself. I have observed striking cases where men seemed to be perfectly well and sound in wind, but fairly rapidly they have begun to go down the hill, and have died perhaps in two or three months.

3144. How do you think that the dust acts as a precursor—is it by setting up points of irritation in the lung tissue?—I should think so. I should say it is a very difficult question of pathology why this kind of dust should act so efficaciously in promoting disease, whereas any amount of coal dust or ironstone dust seems to do no harm.

3145. Does the incidence of the disease upon one special part of the lung make any difference?—I think that is a help in diagnosis. In the case of miners' phthisis it is often the base which is attacked. These cases of miners' phthisis very often seem to start by what might be thought to be an infection of the bronchi; they have symptoms of asthma, but the sputum is full of tubercle bacilli.

3145*. Supposing a case came to post-mortem examination, the mere presence of dust in the lung would merely show, would it not, that a man had been a miner, and would not show that he had died of the dust?—Yes.

3146. It would be by the characteristic changes in the lung due to dust which you would rely upon, would it not?—I meant to say that you would find plenty of evidence of dust in the lungs if the case were a case of miners' phthisis. However long a man had been away from the occupation, his lungs would be full of dust.

3147. (Chairman.) But you would only be able to discover that by post-mortem?—Yes.

3148. (Professor Allbutt.) In a word, would an expert medical man be able, with adequate history of the individual case, in your opinion, in the large majority of cases to give a fairly sound judgment as to whether the disease was one due to the occupation or part of the ordinary incidence of phthisis?—I think he would.

3149. (Dr. Legge.) Do you say, in your report on the health of Cornish miners, on page 18, that "the existing prejudice in Cornwall against post-mortem examinations had prevented the making of post-mortem examinations." Have you ever been able to make one?—Yes, one or two.

3150. Did you find the condition of the lung, as you say here, the same as that contained in the examination and report on a lung by Dr. Andrews, which is published in the Chief Inspector's Report?—We have never had a case exactly the same as that. We went very carefully into the post-mortem appearances in the case of an old man who died evidently of miners' phthisis. Speaking from memory, he had been about 10 years away from the work, and we found stone dust present.

3151. Would you modify this statement in the Report:—"We have little doubt that these changes would be found to be similar in nature to what has already been observed in cases of lung disease produced by inhalation of stone dust. We would refer in particular to the very thorough and careful report by Dr. Andrews on the lungs of two miners who had died from lung disease induced by inhaling ganister dust. In both these cases there was evidence of extensive fibroid change complicated by tubercle." What modifications do you find in the case of the Cornish miner?—In the case I am thinking of the lung was full of cavities, and very much like a case of ordinary phthisis; and on microscopical examination it was found there was no end of stone dust in the lung tissue.

3152. Did you make any inquiry as to whether there were any systems of insurance in vogue amongst the miners in Cornwall?—There are sick clubs at the mines. I do not know about other mines, but at the mine I know best they have had a sick club for about 100 years.

3153. Does that club give pensions?—It gives sick allowances. When a man is ill he gets an allowance. Each man contributes something from his wages—I

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think only about 6d. a month—and it is managed by the miners themselves.

3154. Have those clubs been able to meet the burden thrown upon them by this sickness?—Of course, all the worst cases are cases of men who have not been regularly employed at one mine, but men who have been abroad.

3155. But if they came into employment in that mine, and became ill in this way, would they receive so much per week until their death?—My impression is that there is a discrimination made according to the length of time of service. I know usually a mine provides for its own men, and will help them when they get old.

3156. Do you know what the amount of the pension is?—I have seen old men there who get some very light work on the surface at a good wage, and I believe that actual pensions are also given.

3157. So that a system of insuring against disease is in vogue at the present time?—Yes; but it does not meet the very numerous cases of miners who are not, as it were, attached to any particular mine.

3158. With regard to the Transvaal miners, who appear to have affected the mortality figures in this Report so much, is it not likely that, in consequence of returning from a warmer climate to this country, they rapidly succumb?—Yes, I think so; and perhaps there is more tubercular infection in this country than in a new country.

3159. If you leave out the Transvaal miners from your figures the conditions are serious, but vastly less so than when they are included?—Yes, much less.

3160. (*Chairman.*) Do I gather, as the upshot of your evidence, that you are clearly of opinion that it would be incorrect to say that fibrosis of the lung is an industrial disease, and that other lung troubles are not industrial? If the Secretary of State were to schedule fibrosis of the lung as a disease for which compensation was payable, would that definition necessarily cover all cases of industrial lung disease?—No; I think it is not quite a suitable description.

3161. Is there any description which would tally with those lung diseases that are industrial in their nature?—Do you mean in word or designation?

3162. Yes, any term?—I do not think there is any very satisfactory term. Perhaps silicosis would express it, but I like the ordinary sort of names like miners' phthisis.

3163. But is not that rather begging the question? Is not that assuming that phthisis in the miner is a trade disease?—Yes; and I have not the smallest doubt that in a metalliferous miner it is a trade disease.

3164. But a coal miner, for instance, might have phthisis, I suppose?—Yes; and his work is one which is singularly free from phthisis.

3165. No Court would give compensation, would it, to a coal miner who had phthisis merely because miners' phthisis was scheduled in an Act of Parliament?—Certainly not; it would be absurd.

3166. Are you sure the Court would not interpret "miners' phthisis" as meaning the phthisis of a miner? You suggest the word silicosis, do you?—Yes; that is used a good deal.

3167. Would that cover all the cases that ought properly to be covered in this connection?—I am afraid there are other cases of phthisis due to dust inhalation which are not due to the inhalation of silica.

3168. (*Dr. Legge.*) Would you extend your definition of silicosis to siderosis, and then you would have a comprehensive term?—Yes, I think that, on the whole, would be better than fibrosis.

3169. (*Chairman.*) Do I understand you to say that a man who has been engaged in a dusty occupation, such as ganister mining or gold mining in the Transvaal, has fibroid affection of the lung which may remain latent, and often does remain latent for a very long time, but that if by chance he comes into contact with tubercular infection he is specially liable to tuberculosis, and may die of it?—Yes, that is my view of it certainly, except that I should not like to say that he has a fibroid affection of the lung, but that his lung is injured in some way, in such a way that it is rendered much more liable to the attacks of the tubercle bacillus.

3170. If he did not come into contact with tubercle infection he might live on, and die of senility, might he?—As far as my experience goes, that is possible.

3171. Do you think it is at all probable?—I have not had sufficient experience to say. I think it is possible he might have a perfectly non-infective fibrosis of the lung.

3172. (*Professor Albutt.*) You would probably agree that we are all of us always exposed to bacilli, and breathe plenty of them, I suppose?—Yes.

3173. (*Chairman.*) Do you think if we use the term silicosis and siderosis of the lungs that that would cover the case of a man who really died of tuberculosis which was a trade disease only in the sense that he had been made specially susceptible to tuberculosis from the fact of his lung having been injured by the inhalation of dust?—I think that would cover it.

3174. Do not you think the employer might plead, "This man has not died of siderosis or silicosis, but has died of ordinary tuberculosis, which anybody else might die from"?—He might plead that, and it might appeal to a magistrate who did not know the facts, or perhaps looked it up in some books which stated the facts wrongly. But it is a well-known fact that those diseases are tubercular.

3175. It ought not to mislead a medical man, ought it?—No.

3176. Is it your opinion if the words used were silicosis and siderosis of the lungs no injustice would accrue?—I do not think so. I think very soon cases would be decided in a perfectly fair way.

3177. Would those terms cover potters' phthisis, ganister disease, and all metalliferous miners' phthisis?—Yes, I think so.

3178. (*Professor Albutt.*) Do you mean to suggest that fibrosis does not arise frequently from other causes than those?—Certainly it arises from other causes, and my only doubt is as to whether it really arises from dust.

3179. So that we are not to use the word fibrosis in any specific sense, not even in respect of dust phthisis?—That is my feeling about it.

3180. (*Chairman.*) Can siderosis and silicosis of the lung be diagnosed without a post-mortem examination?—I think for practical purposes they can, but if the matter were contested in a court it would be troublesome to say with absolute certainty. I should have said that a magistrate would be able to decide a case fairly if he heard from a medical man that the chances were perhaps 10 to 1 or 50 to 1 that it was such a case.

3181. This particular question is left by the Bill to the medical officers. The judge has only to decide whether a disease, having been ascertained, does or does not arise from the employment. It is for the medical man to say whether the special disease is there or not?—I think the medical man can only say, if he does not make a post-mortem, that it is 10 to 1, or something like it, that the disease is due to the inhalation of dust.

3182. (*Mr. Cunynghame.*) We have had some evidence that dust sometimes produces not phthisis but bronchitis. Have you anything to say with regard to that, as regards the effects of dust from silica?—These cases of miners' phthisis in Cornwall would often be put down as chronic bronchitis.

3183. Supposing the words "miners' phthisis" were employed in a definition, would the word phthisis be held medically sufficiently wide to cover bronchitis?—Bronchitis occurs as a symptom of phthisis.

3184. Is bronchitis only a symptom of phthisis?—Yes, it may be a symptom of phthisis.

3185. If a man had bronchitis and was really very ill with it, would you call it phthisis?—You would diagnose phthisis more from the wasting and other accompaniments.

3186. Would bronchitis without that wasting be a characteristic disease of which you have been speaking?—No; but you do get bronchitis from dust, especially dust from fibres, flax, and things of that sort.

3186*. But the proper description as to these miners would be phthisis, would it not?—Yes.

3187. (*Chairman.*) Siderosis and silicosis of the lungs would not cover bronchitis, would it?—No, it would not cover pure bronchitis.

3188. But bronchitis you think in some cases may be an industrial disease, do you?—Certainly.

3189. In what cases?—In the case of persons inhaling flax dust in a very dusty room. I do not think it is anything like so dangerous as stone dust.

3190. May a man be incapacitated by it from work?—I think so, particularly in the winter.

3191. Can that form of bronchitis be distinguished from the ordinary bronchitis which is prevalent among other persons?—That again is a matter of the medical history of the case.

3192. Are the symptoms precisely the same? Supposing there are two brothers, one working in a flax mill and the other a gardener, and both have bronchitis, could you say the gardener's bronchitis was in any way different from the mill-worker's bronchitis?—I think it might be difficult to say, except from the history of the case, and from the fact that the mill-worker knew that when he went into the mill he got worse.

3193. Then would you be entitled to say that the mill-worker would not have had bronchitis unless he had been in the mill?—I think so; I think you could say so from the history of the case.

3194. (*Mr. Cunynghame.*) On the other hand, you

would not put down all the bronchitis that mill hands had necessarily to the dust, would you?—Oh, no; there is a good deal of bronchitis apart from that.

3195. (*Chairman.*) Would it be a very doubtful point in any individual case whether bronchitis was industrial or ordinary?—Yes, I think so.

3196. (*Mr. Cunynghame.*) It has been stated by a witness that in some towns they attribute the prevalence of respiratory diseases to the immense amount of dust in the air, and that the inhabitants catch it a good deal from the dust and surrounding conditions as much as the workmen do. Do you happen to have anything to say upon that point?—I do not know which towns you refer to. At Middlesbrough there is a sort of epidemic of pneumonia, which occurs badly every two or three years. It is a horrible epidemic, and no one has ever yet got to the bottom of it, or why it sticks to Middlesbrough. But the evidence is against its being due to the dust of the town.

3197-98. So that in considering this question of diseases in particular places, I suppose we must be careful to look at the particular town in which it occurs, and the conditions of health of the town, otherwise we might be led to wrong conclusions occasionally?—Yes, I think so. That is a case where I think the evidence is against pneumonia being due to the dust.

Mr. RUSSELL FORBES CARPENTER, F.I.C., called in and examined.

3199. (*Chairman.*) Are you Chief Inspector of Alkali Works under the Local Government Board?—Yes, that Department concerns itself with the regulations as to the emission of acid gases specifically in some cases, and using "best practicable means" in other cases.

3200. Previously to that did you have considerable experience as a manager of chemical works?—Yes.

3201. The cases which we wish to investigate are not those which can be described as accidents, you understand?—Yes, I was here when Dr. Rogers, of Cliffe at Hoo, gave his evidence.

3202. The case of a tap which leaks, with the result that a poisonous gas is emitted, and a man falls down incapacitated does not concern us, because that is an industrial accident. Of those diseases or injuries which are mentioned in the paper you have been good enough to hand me, will you take first poisoning by sulphurous acid gas?—That we have very considerable experience of as regards the evolution of the gas and its control in the manufacture of sulphuric acid, which is the largest acid manufacture existing.

3203. Are the poisonings there in the nature of accidents?—No. I do not think we could very well trace any poisoning or any evil results following from it. In the case of a man coming to the employment, that is to say tending the burners which evolve the gas, if in a few weeks he finds his breathing affected, he would leave and get some other employment. The employers desire this work to be in the hands of the very steadiest men. From my experience they prefer to employ married men if possible, because they have responsibilities in the shape of families to keep, and so on. The operation goes on continuously, year in and year out, till the plant is stopped, so that the men have to work in the steadiest possible fashion night and day.

3204. Are there any cases of men being incapacitated from this process?—Only such as those whom I may describe as having an idiosyncrasy, and cannot bear the smallest traces of the gas.

3205. They are not incapacitated from work, are they?—No, the employment is of the steadiest kind, so that the men can go on to old age.

3206. Then with regard to sulphuric acid vapour, are there cases of poisoning?—That, I think, is a most irritating vapour to the bronchiæ of men who are constantly exposed to it, and might develop a tendency to bronchitis; but again I do not know of any serious incapacitation of men who have been engaged in the work.

3207. Have you come across any men who have been obliged to give up work because they have been employed in a process in which they are exposed to sulphuric acid vapour?—Yes, I know men have found that they have had to give up the work.

3208. Were the symptoms bronchial symptoms?—Yes.

3209. With regard to nitrous fumes, are the cases of poisoning accidental poisoning or gradual poisoning?—I think all the cases I know of are cases of accidental poisoning. That is also a gas which some men cannot stand. I think the evidence of Dr. Rogers explained clearly the nature of it.

3210. Then what do you say as to chlorine fumes?—There has been a great amount of evidence taken for the Home Office on the subject. In 1893 a Home Office Commission went round the centres of industry and obtained a great deal of evidence, and there again there is the idiosyncrasy that the men who can stand it, stand it for years. The work of packing the chambers, while it lasts, is very laborious. I know a case of a man who ruptured himself from coughing by inhalation of the gas, which I take it would not be an accident, but something arising from the nature of his employment. A man might get a bigger dose than usual, and the case I know of is that of an employer who is ruptured to-day. If he had been a workman he could not have followed his employment. Most of this work is piecework, I may say.

3211. Do you think there is a distinct trade disease arising from chlorine processes in alkali works?—Or in any works. Of course chlorine fumes are greatest in alkali works.

3212. Then what do you say as to sulphuretted hydrogen? Is that also evolved in alkali works?—Yes, from the alkali waste.

3213. Do you get gradual poisoning from that?—I may say I am a sufferer myself from that, and had to give up my work at Bristol owing to the effects of gradual slow poisoning by sulphuretted hydrogen. I am a very bad instance of the effect of sulphuretted hydrogen on the system. My whole mucous membrane seems to absorb it. In employments of the gas where it is evolved together with steam, the intense pain produced behind the eyes leads to great congestion, and some men become blind. On most men under such conditions sulphuretted hydrogen has a very great effect, and there are few cases of insensibility to it. A man can follow his occupation and do his work, but he will go home with great pain in his eyes, be almost blind, and would pass a sleepless night.

3214. Is the blindness permanent?—No; it proceeds from congestion of the retina.

3215. Are men incapacitated for any considerable time?—No.

3216. Therefore in all these cases a man may be particularly susceptible to the deleterious effects which are temporary and unpleasant, and might lead him to go to some other employment, but he is not permanently injured in his health?—In the cases I

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have in view the men preferred to retain their employment in spite of these symptoms.

3217. If they were entitled to claim compensation for incapacity, do you think that a Court would hold they were incapacitated?—It depends, I suppose, upon the number of times it happened.

3218. Could you say it was in any sense a disease? For instance, you would not say you yourself suffered from a disease, would you?—No, I used to suffer from susceptibility.

3219. Which would, if you were working in this employment, cause you discomfort and pain?—Yes.

3220. But so soon as you came out of the atmosphere in which the sulphuretted hydrogen was, the symptoms would disappear, would they?—No, with me they would be permanent, and amount to a permanent disablement.

3221. But it would not disable you from following any other employment, would it?—No, not when the effects had passed away.

3222. Would the effects pass away after a very short interval?—Sulphuretted hydrogen is so insidious that with me it produced a succession of sick headaches, so that it was four years, from 1878 to 1882, before I was able to take up work again.

3223. You were incapacitated from all forms of work for four years, were you?—Yes; it lowered my constitution to such an extent that I was away four years.

3224. Is there any doubt in your mind that your sickness was due to that cause?—I have no doubt.

3225. Did the doctor so certify?—Yes, my father took me to Sir George Burrows, and he had no doubt about it, and ordered me to give up my work.

3226. Since those four years have you had a recurrence of the same symptoms?—Yes, in the course of my duties. I take care not to expose myself to the fumes for very long, because it would not do for me, but sometimes I go home suffering from sick headache.

3227. Are you sure it is from that particular cause?—Yes, it is from that particular cause.

3228. What have you to say as to bisulphide of carbon?—I want to distinguish between the manufacture and use of it. I think in the latter there are more dangerous risks. I have heard of people being incapacitated far more in the use of it in the india-rubber trade, but the diseases that arise do not show themselves among those who manufacture it so much; it is chiefly the women in the rubber trade who are exposed to it, while in the manufacture of it I have not come across any evil symptoms. If precaution is taken, any effects can be prevented in the manufacture, but it is when the substance comes to be used that the evils begin to appear.

3229. May similar symptoms appear in the manufacture unless precautions are taken?—Yes, and what we ask is to see that the "best practicable means" are used to prevent the escape of noxious vapours. The words in the Act are "alkali, etc." There are 20 substances named in the schedules to our Acts.

3230. Is the manufacture of bisulphide of carbon entirely under your inspection?—Yes, and I am glad to say there is very much less being made now for use in the various trades; other things are being used instead.

3231. Are the symptoms arising from arsenious acid and arseniuretted hydrogen the same?—Totally different.

3232. They are not symptoms of arsenic poisoning?—No, I am familiar with the symptoms of arsenic poisoning in the course of my duties in works producing arsenic (arsenious acid). That comes under the best practicable means, and the cases of arseniuretted hydrogen that have come under my notice are from totally different trades. Again, there are other arsenic compounds with different symptoms that are given.

3233. Then with regard to binitro-benzol, what do you say?—That comes under our notice in the use of nitric acid. I have not much to say upon it, because it has been already dealt with. As Dr. Arlidge has said, we are confronted with a new set of symptoms which require the greatest care. I have heard of cases of coma from its inhalation, followed by death. You cannot call it an industrial accident, I think, if in

following the course of duty some change in the nature and purity of the materials used takes place. Chemical reactions take place in batches and charges, and in some particular charges there might be greater evolution.

3234. (Mr. Cunynghame.) Would not you call that an industrial accident?—It might happen in the usual course of employment.

3235. (Chairman.) But if it happens at a given moment of time, what would you say?—Over the period of the batch or charge, yes.

3236. Would it be a question of hours or minutes?—It would be a question of hours.

3237. Do all these cases of poisoning which you have mentioned arise sometimes in the manufacture and sometimes in the use of these things, and sometimes in both? Taking the manufacture, are they all manufactured in alkali or chemical works?—Yes.

3238. Do they all come under the category of alkali or chemical works?—Yes.

3239. Would alkali works come under the category of chemical works?—Yes.

3240. So that if the committee, for example, were to put into the schedule any case of poisoning by any chemical product happening to any worker in any chemical works, it would cover all those cases, would it?—It would cover all those cases except as to the use.

3241. As, for example, bisulphide of carbon in india-rubber works?—Yes; or of chlorine products in bleaching works.

3242. Have you any statistical information with reference to these diseases?—No, I have no statistical information. We only deal with the gas escaping as affecting the public outside.

3243. (Mr. Cunynghame.) In the cases you have mentioned, I am not quite clear whether all of them, or any of them, and if so, which, are to be described as accidents. Have you a pretty clear conception of what ought to be the meaning of the word accident?—Yes; perhaps my conception and yours would not agree.

3244. In what respect would they not agree?—In the case of binitro-benzol, I should not agree as far as any evolution of a noxious gas during the course of manufacture, would come under the nature of general employment.

3245. Yes, it is a general employment, but the question is whether the thing that has occurred is an accident, or the contraction of a disease?—I am looking at the process.

3246. I am looking at the way the illness occurs. Have you clearly in your mind the distinction between an accident and the incurring of a disease. Let me give you an instance. If a large reservoir of gas were to leak, and a man got poisoned, though it might take three hours to poison him, that from the point of view I am putting, would be an accident, would it not?—Yes, I agree.

3247. But if the reservoir leaked, and he went there day after day, and week after week, and gradually accumulated into himself a slow poison, would one call that the contraction of a disease?—Yes, I agree.

3248. Speaking from that point of view, are the results from these gases to be regarded as the contraction of disease or as accidents?—I regard them as the contraction of disease in consequence of the necessary variations. You cannot always rely on a man in one department doing exactly what he is told, and the product sent to another department may vary slightly in its composition.

3249. Take, for instance, nitrous fumes; it is clear, is not it, that if a man is suddenly exposed to an outburst of nitrous fumes, he would be very ill, and that would be an accident, would it not?—Yes.

3250. Would there be an effect produced upon that man by the very slow daily absorption of nitrous fumes, not sufficient on any one occasion to cause an accident, and yet sufficient to deteriorate his health?—I do not know of such cases.

3251. The only cases you know of then are accidents, are they?—Yes.

3152. With chlorine it is plain, is not it, that a sudden outburst, or rather a rapid outburst, might make a man ill?—Yes.

3253. Do you know of an illness produced by a small

daily absorption of chlorine, not sufficient on any one occasion to amount to an accident?—No, but the conditions may be there; if a man goes deliberately in to get the work done, there may be a larger amount of gas in the place he has to go into.

3254. Then that would be an accident clearly, would not it?—It would be his own doing.

3255. If a man goes into a chamber where there is only supposed to be a small amount of chlorine, and in reality there happens to be from some cause a considerable amount there, and he gets poisoned and is taken home, that would clearly be an accident, would it not?—No, I think not, because he deliberately went in on his own account.

3256. That does not matter. We must read "accident" in the sense in which it is used in the Bill. What I ask is, is it possible to contract an illness through the absorption daily of a very small amount of chlorine, which would not entirely incapacitate on any one occasion?—No, there may be cumulative effects producing bronchitis, and then the men would leave the occupation.

3257. Have you known cumulative effects produce bronchitis?—Yes, and a man leaving his occupation.

3258. But have you known of cumulative effects not producing bronchitis?—Yes, what some men could stand others could not stand.

3259. Do you know of any particular case of chronic bronchitis being produced by daily working in chlorine works?—Yes, I know of a case in the works I was at.

3260. How long had the man been working?—He might not be working more than a week perhaps, but it would be sufficient. He would try to go on with his work, but could not, and he would give it up, and the bronchitis would not recur.

3261. He would be ill, and he would leave his occupation and go to something else?—Yes.

3262. Would that be due to an idiosyncrasy?—I should call it an idiosyncrasy.

3263. Would an ordinary man be able to work in small quantities of chlorine without contracting bronchitis?—No, I think they are special men. They are to be found in every works. They choose the employment because it is well paid and the hours are short. There are always men ready to try it.

3264. Would an ordinary man, working in small quantities of chlorine, who had not this idiosyncrasy, be likely to contract a disease from his occupation?—I should say he would be liable to it.

3265. There is, then, in your opinion, a chlorine disease. Is chlorine, in addition to being capable of producing an accident, capable of producing also what may be a disease? Never mind about the man's volition, that has nothing to do with it?—Yes, I should say it is possible. I should not call it a chlorine disease; I should call it bronchitis.

3266. You would say that small quantities of chlorine are capable of producing bronchitis, would you?—What I have been told by medical men is bronchitis.

3267. Can it produce phthisis, for instance?—I have never heard so.

3268. You say that sulphuretted hydrogen when breathed in small quantities will produce a lasting disease?—A condition that will last some time and require medical treatment.

3269. Would an ordinary man who had not this idiosyncrasy be likely to catch it?—Not an ordinary man. I have met a few like myself.

3270. Those men who get it are men with the idiosyncrasy, are they?—Yes, but with chlorine it would be the other way about.

3271. It is abnormal men, then, who can stand the chlorine, is it?—Yes.

3272. Just as it is abnormal men who cannot stand the sulphuretted hydrogen?—Yes.

3273. I suppose in the chlorine works the men go in with helmets over them?—No, with pieces of flannel which come up under the nostrils.

3274. Are you aware that in some works where chlorine is made the men have helmets and air tubes, like a diver wears?—They may appear in the books, but I have not seen them. They may put them on to show people when they go round.

3275. It is the popular belief, is it not, that the

effects of chlorine are cured by a certain amount of alcohol?—It is.

3276. And that induces a certain amount of drinking, I suppose?—When the Commission went to Newcastle, one old man told them that he was "drunk every night of his life, thank God!"

3277. That, I suppose, represents the habits of a certain section of the chlorine workers?—Yes, but I am glad to say not all.

3278. What permanent effects do bisulphide of carbon produce?—That I think you had better get from others, because I have no personal knowledge of the matter.

3279. Then what are the effects of arsenious acid and arseniuretted hydrogen?—There is a difference between the different symptoms.

3280. Have you any knowledge as to the effects of binitro-benzol?—I thought I would direct the Committee's attention to it, but I see Dr. Haldane has dealt with the question. I have known of a case of coma, followed by death, as the result.

3281. But those would be rather accidents, would they not, for which the Bill provides already?—Yes.

3282. In regard to the use of all these things there are rules, are there not?—Yes, I have the rules with me. Our Act contains a provision for sanction of rules during the conduct of operations.

3283. Have you made rules for the workmen in those cases?—Yes, there is a provision in our Act that rules can be drawn up by the employer, and they can be revised by the Local Government Board, and when the President signs the rules they are sanctioned as rules governing the operation, and fines can be recovered by the employer for any breach of them.

3284. In those cases it is the employer who proposes the rules, is it?—It is the employer who proposes the rules, and the Local Government Board sanction them.

3285. Have the Home Office made any rules under the Factory Acts?—Yes, there are certain rules made by them in addition.

3286. Will you kindly put in a copy of your rules?—Yes, such rules as have received sanction. I can send you the rules drafted by the United Alkali Company. I do not know whether you have in view calling the secretary of the United Alkali Company, who has considerable experience.

3287. Would the secretary present the subject from the employers' point of view?—Yes, and no doubt could give you valuable statistics about sick clubs. At Bristol we had a sick club, but it was comparatively small. There were only about 400 or 500 men on the wage-sheet, and a large number of these would not be process men, but masons, joiners, fitters, etc., but they would have sick clubs at all the works at Widnes and St. Helens, and you could get data of very considerable value.

3288. Is there a trade union of the men in the chemical industry?—I have no knowledge on that subject. I expect they have one, but I have no direct knowledge.

3289. (Dr. Legge.) You spoke of sulphuric acid as affecting the men's chests in such a way that they could not continue to work in it?—Some cases are known to me.

3290. As a rule it affects everybody a little at first, I suppose?—Yes.

3291. And the workers usually get accustomed to it?—I do not know. It is a very difficult thing to get accustomed to it. You cannot get accustomed to it in large quantities.

3292. They would not be incapacitated from finding other employment, would they?—No.

3293. And the probability is, I suppose, they would find other work in the same factory?—Yes.

3294. Do you regard sulphuric acid fumes as setting up a definite disease. It is stated in nearly all the books on occupational diseases that the men in the sulphuric acid departments of chemical works are the healthiest; have you any knowledge as to that?—That is in the first process, not in the concentration of it. The concentrated product is a very different thing. In the first stage they choose married men, and they are able to follow their occupations steadily without illness.

Mr. R. F.
Carpenter,
F.I.C.

7 Dec. 1906.

Mr. R. F. Carpenter, F.I.C.
7 Dec. 1906. 3295. There is one chemical which you have not mentioned at all—hydro-cyanic acid. Do you know of any illness produced by that?—Yes, I have known of it as contributory to death.

3296. (*Mr. Cunynghame.*) Is there a definition in the Act of Parliament of alkali works?—Yes, there is a strict definition.

3297. Do you remember what it is?—Yes. The definition chiefly refers to the decomposition of salt or chloride of sodium with sulphuric acid with evolution of muriatic acid.

3298. How do you come to inspect works where chlorine is used?—Under the words, "Alkali, etc., works," which is the title of our Act. The Act of 1881 includes seven groups. "Etc." is defined by the schedule.

3299. Are they mentioned in the Act?—Yes, in the schedule, and in the schedule to the Act of 1892 other works were mentioned; we have a new consolidating Act coming into operation on the 1st of January, and

we shall be able to comprise all this; so that there are 21 groups in the schedule in addition to alkali works. "Alkali work" is simply defined as one "for the manufacture of alkali, sulphate of soda, or sulphate of potash, in which muriatic acid gas is evolved, and for the purpose of this definition the formation of any sulphate in the treatment of copper ores by common salt or other chlorides shall be deemed to be a manufacture of sulphate of soda."

3300. The chief object of your Act is to protect the public and not the workmen, I understand?—That is so; but in so far as the employer wishes his manufacture to be conducted in conformity with the Alkali Act requirements, if his workmen do not comply with his desires, the Act provides these rules, of which I will send a copy.

3301. Then the words "alkali, etc.," as conferring jurisdiction on your Department, are not quite as wide as the words "chemical works," are they?—No, it only means certain chemical operations.

TWELFTH DAY.

Friday, 14th December 1906.

PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Mr. W. ROBINSON, M.D., M.S., F.R.C.S., called in, and examined.

Mr. W. Robinson, M.D., M.S., F.R.C.S.
14 Dec. 1906.

3302. You are a surgeon in practice in the county of Durham?—I am.

3303. And you are honorary surgeon to the County of Durham and Sunderland Eye Infirmary?—Yes.

3304. You have a knowledge of the disease known as bottle-finishers' cataract?—I have.

3305. Is that a disease frequent among bottle-finishers?—Yes, it is very frequent. I have the figures of the three works that are at present in Sunderland and its district, and I find that there are 374 men working in bottle works, and of these 374 122 are bottle-finishers. I have described the work in a paper which I have here—(*handing in the same*)—and which was published in the *British Medical Journal* of 24th January, 1903. The bottle-finisher puts on the rim to the neck of the bottle, and he has to look into a big furnace, half the size of this room, where the temperature is said to be about 2,500 deg. F. I have calculated that he looks into that furnace during the week something like 5½ hours. The consequence is that a very large proportion of these bottle-finishers get cataract. I find there are 27 men who are receiving superannuation allowances from the Bottle Makers' Society who have been bottle-finishers. There are 122 at work, and 27 who are incapacitated from work on account of cataract. If you add 122 to 27, it makes 149, which works out roughly 1 in 6 who have now cataract at a comparatively early age; which is an enormous proportion, of course.

3306. But the 27 are men who have contracted cataract over a considerable period of years, I presume?—Yes.

3307. And the 122, of course, are men employed at one particular moment?—Yes.

3308. Perhaps if you were to take into consideration all the men employed during all the period of years in which those 27 had contracted cataract, there may not have been 122, but perhaps a thousand?—No, not a thousand.

3309. I will not say a thousand, but considerably more than 122?—Yes; but on the other hand, there are some men who have contracted cataract who are not getting any superannuation allowance. The fact is, that if a man leaves his work as a bottle-maker, he is no longer a member of the society, and, consequently, he is not entitled to superannuation allowance, and some men leave when they begin to feel their eyes affected, I am told. And then, in addition to that, there are a number of bottle-finishers at work who have commencing cataract. I have a letter here from one of their secretaries, from whom I have made inquiries. Perhaps I may read it.

3310. If you please?—This is from the local secretary of the Glass Bottle-makers' Trade Society, at Seaham Harbour: "I am sorry that I cannot furnish you with all the information you require, as there is so little time, and it is very difficult to get to know all the cases of cataract there is, as men don't care to give publicity to the same; if I had time, say a few months, I might have got to know a great many cases by private inquiry; there is many young men that don't care to let it be known who have cataract, but there is 6 cases in our factory of men that is incapacitated through cataract; there is 54 finishers working in our factory at the present time." Those are the lowest numbers of the three works, 6, and 54. "I myself am only 42 years old, and the sight of one of my eyes is gone, and if anything was to happen to the other I would be done work, and I believe there is many like me if inquiries were to be made. There has been no precaution taken as yet in the Seaham Harbour Works."

3311. Do the figures that you have given cover the whole country?—No; only my own district of Sunderland, Southwick, and Seaham Harbour. Those are all the bottle works whose worst men come to the Sunderland Eye Infirmary.

3312. Have you any knowledge of the occurrence of cataract among this class of workers in other parts of the country?—I have not. It only occurs in bottle-

makers. It does not occur in other glass workers, such as make glass jars, because, in making tumblers and things of that kind, the men do not look into the furnace. The melted metal is led out into little troughs which they call "pots," and consequently the workmen do not look into the bright heat and light. There is only a little trough at the side of the furnace into which the metal is led and into which they look.

3313. So that, so far as you are aware, this particular disease is limited to that one class of workers?—Yes; it used to be called bottle-blowers' cataract, but that was before I wrote my paper. But it never occurs in the blowers, because the blower never looks into the furnace. It takes about five men to make a bottle, each person doing a certain part of the work, and the blower never looks into the furnace. He has a long iron tube about 6 ft. in length, and he blows the bottle; but he is not looking into the hot furnace at all; consequently he does not get cataract unless he has been a gatherer (that is another man who looks into the furnace), and afterwards becomes a finisher. The men are promoted from the lowest up to the highest grades, and the finisher is the last step really; a bottle-maker is promoted to be a finisher last of all. That is the highest step he can attain to.

3314. What is a gatherer?—A gatherer is a lad, generally an apprentice, who takes a long iron tube, about 6 feet in length, and dips it into the furnace to get the requisite amount of metal to make the bottle; he hands it on to the bottle-blower, and after the bottle-blower has finished with it he hands it on to the finisher. A boy, if he goes to be a bottle-maker, begins bottle-making generally as a taker-in; that is to say, he takes the finished bottle and carries it into the annealing chamber. Then he is promoted to be what they call a putter-up or wetter-off, when his duty is to put up the iron pipe, on which the bottles are blown, into the furnace to heat it to the requisite heat, and before it does that he knocks off the remains of the old bottle. Then, after being at that work a year or two, he becomes a gatherer, whose duty I have just described who gathers up a certain amount of metal.

3315. Then a gatherer is also liable to cataract?—A gatherer very rarely gets cataract, because he is a young man as a rule, and does not remain many years at that particular job. I have been told that there is one gatherer who has cataract in one eye, but whether it is true or not I am not able to say, because I have not seen him. Then, after his time as a gatherer is finished, he gets promoted to be a bottle-blower, and a certain proportion of them, if they are very expert, get promoted to be bottle-finishers, and the bottle-finisher is the man who has been longest at the work, and has probably been a gatherer before. I have described the work in detail in my paper.

3316. What is approximately the minimum period within which cataract occurs among these classes of workers?—The youngest bottle-finisher I find who has had cataract is a man who had the cataract removed at the age of 36.

3317. How many years are they at work before they get it?—It usually begins before 50, whereas the ordinary senile cataract rarely begins before 60.

3318. But if a man was at work, say, for a year, would he be liable to contract this disease?—I should not think so. They all begin as apprentices, you see, and they have probably gone there at the age of 14 or 15, and cataract does not begin, as a rule, till between 40 and 50.

3319. So that it is not only the nature of the work; there is also the chance of its being due to advancing years?—No, I should not say so, because it begins in a particular way—not in the ordinary way in which the ordinary senile cataract develops.

3320. But supposing that a young man went to work, say, at 25, and was employed as a finisher, and was employed at it continuously for five years, would he be liable to get cataract?—He might; but of course he does not begin as a finisher right off—they cannot.

3321. As a matter of fact, such cases do not occur, because they do not start as finishers so young?—That is so.

3322. At about what age do they start to be finishers?—Generally between 20 and 30, because only

a proportion ever become expert enough to become finishers. They make an enormous number of bottles in a day, and they do them very quickly; I forget how many gross.

3323. The point I want to get at is this: How many years would a man be at work at this particular process before he was liable to contract cataract?—I should say the average age is somewhere between 45 and 50.

3324. I am not speaking of the age, but of the number of years at this work?—If he began at 14 or 15 it would be about 30 years.

3325. I mean in this particular process. Supposing a man was put to this particular process, and was at work at it for a year, no matter what his age was, would he be likely to get cataract?—Not in a year. I should say more like 20 years, on an average.

3326. After 20 years at this particular process?—I should think so.

3327. And is it a disease of very gradual growth?—Yes, it comes on very gradually. A man can generally work, after the first symptoms show themselves, for from two to four years, and if he uses atropine drops, which dilate the pupil, he can probably go on a year or two longer, because the first signs of opacity in the lens are opposite the centre of the pupil, at the back of the lens. There are diagrams in my paper which illustrate this.

3328. Then a man can have this disease of the eye in a mild form, and go on working for a number of years?—Yes; and I should think that several of the 122 finishers have commencing cataract.

3329. If this disease were included in the Schedule to the Workmen's Compensation Act, and men were able to get compensation for it, do you think that employers would cause their men to submit to an examination of the eye, and would discharge men who showed any likelihood of contracting this disease?—I do not think so, because when a man goes to a bottle-works he must go as a youth, and be trained up in it. He cannot suddenly take up the work. They might ask a boy to submit to such an examination before he entered, or at an early stage. But what I think they would certainly do would be to insist on the men wearing coloured glasses, either dark blue or very dark smoked glasses. Since I recommended protective glasses I find that about half the finishers at one bottle-works use goggles now, and about a quarter in the second bottle-works, but in the third no goggles are used. At first the men could not wear goggles, because they perspire most profusely owing to the heat, and the moisture condensed on the glass, but they now use a preparation which I think is a kind of soap called lasin, which prevents the moisture condensing on the glasses, so that they can see clearly; and since they have used lasin they can wear goggles, and a certain proportion of them do wear them.

3330. Has that use of goggles had any effect upon the disease?—I think so, because the number of cases that we have seen in our eye infirmary has diminished very considerably since I wrote my paper four years ago. In 1902 we treated 18 cases of hard cataract, which is a very large proportion.

3331. Was that among the bottle workers only?—Yes.

3332. (*Professor Allbutt.*) Can you tell us what is the normal incidence of cataract?—It must be very small, because Sunderland and the district has a working-class population, and nearly all the cases come to the infirmary; and we operated upon in that year (1902) only 75 cases of hard cataract (senile and bottle-finishers').

3333. In your whole number of out-patients?—That is in the in-patients. We do not keep a tabulated record of out-patients, but these were all operated upon as in-patients. I am not speaking of those who were not operated upon. I should say that the disease is 10 or 20 times as common in bottle-finishers as it is in the ordinary population—at least that, I should say.

3334. (*Chairman.*) You were saying that you had 18 cases in 1902?—We had 18 new cases in 1902. In 1903 we only had six new cases, in 1904 we only had two new cases, and last year we had only one. Altogether we had 27 cases in four years from a population of 122 bottle-finishers.

3335. Has the number of workpeople employed in

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this process diminished within the last few years?—Yes, it has diminished. In 1902 there were four bottle works, and now there are only three; but the one that was closed was a small works. They say that the diminution is on account of foreign competition.

3336. The number of persons employed has gradually diminished?—Yes.

3337. But it has not diminished in anything like the same proportion as the diminution in the cases of cataract?—No. Probably a good many of those 18 cases in 1902 were cases that I took into the infirmary for purposes of observation at that particular time, when I was working at the subject, that I might watch the disease developing.

3338. So that that is really an abnormal figure?—Yes, I think so.

3339. Can you differentiate this form of cataract from ordinary cataract?—I think I could in every case, because I know exactly how it develops.

3340. (Professor Allbutt.) You surely could tell on an operation, I gather from this?—I could tell much better if I saw it at the beginning. I can tell it from the way the cataract develops; it begins at the back of the lens instead of near the centre or at the periphery, and it is very rare for senile cataract to develop in that way, though I believe it does so very rarely. We have had one case where a gentleman developed cataract in exactly the same way as a bottle-maker does, and he was not exposed to heat, but it is extremely rare. Besides, the fact of its occurring in bottle workers at a comparatively early age would be sufficient, I think, to show that it is due to that work.

3341. (Chairman.) Is there any term by which this form of cataract is known?—I call it bottle-finishers' cataract. It is a posterior cortical cataract.

3342. And bottle-finishers would not get cataract of other kinds?—They might.

3343. But not from their trade, I mean?—No, I do not think they would. I have never seen it.

3344. Then if the disease were scheduled as posterior cortical cataract, would that cover all cases of bottle-finishers' cataract and exclude ordinary cataract?—I think on the whole it would; there would be very rare exceptions to it. But I should not call it by that name. I should just call it bottle-finishers' cataract, because the majority of medical men would not be able to differentiate posterior cortical cataract from ordinary cataracts.

3345. They would be able to understand precisely what was meant by bottle finishers' cataract?—They would know then that it was a cataract occurring in bottle finishers—that is all.

3346. But a bottle finisher is liable to cataract just as a bootmaker is or a member of Parliament?—Yes, but, you see, it begins in bottle finishers at a much earlier age. I think we hardly ought to have had one ordinary cataract in the 122 finishers.

3347. Then, in your opinion, there would be practically no risk, if the disease were described as bottle-finishers' cataract, of injustice being done to employers in having to compensate men who really suffered from ordinary cataract, which is prevalent among the general population?—The risk is so small that I think it ought to be neglected.

3348. (Professor Allbutt.) You would suggest that there should be a special referee, of course?—I think so. I am quite sure that the ordinary medical man would not be able to distinguish the two.

3349. To put it in another way, it is important that it should not merely be a presumption, but that by means of the ophthalmoscope he should be able to decide definitely on the complaint?—Yes.

3350. And you say there are grounds on which he can decide?—Yes.

3351. The duration of the morbid process it is, of course, extremely difficult to estimate—it extends over many years; this being so, the goggle trials must as yet be imperfect, because they have not been used long enough; but so far as you have had experience, do you think they are acting as a preventative of the disease? I think their use tends to show a diminished development of the disease in those who have used them.

3352. I think you said the disease is permanent when once incurred?—Yes.

3353. How long is it since goggles have been used?—Only since 1903—that is, three years.

3354. And you think they may, perhaps, have arrested the morbid process in certain cases where it had already commenced?—I think it is probable.

3355. There is only one other question I should like to ask you, and that is, taking the mean incidence of this form of cataract as being ten years earlier than senile cataract, what are the extremes?—The youngest man who had a cataract operated upon was 36, and they are all practically under 60, I should say.

3356. The oldest might be about 60?—I have not a record of that just now, but there are six cases described in my paper whose ages are 59, 59, 59 (this is when they were operated upon; some had been off work a few years probably), 53, 40, and 55.

3357. Let us suppose the case of a man of 58; is that about the time it occurs?—Somewhere about 55 as an average, I should say.

3358. Even then, in a case that might be senile a skilled observer could practically always decide, you think, whether it was so or not?—I think so.

3359. (Mr. Cunningham.) To what rays do you attribute this cataract—the heat rays or the light rays that come from the furnace?—I should say certainly the heat is the more important of the two, because it is so very great; it is 2,500 degrees.

3360. And do you think the goggles keep out the radiant heat as much as the light rays?—Yes. I have stated that glass has the property of allowing only 30 per cent. of the heat rays to pass through, so that would reduce it from 100 per cent. to 30 per cent.

3361. Do you know whether a thick glass, or certainly two glasses, one on the top of the other, would be better in the case of heat, because then you get the glasses becoming successively cooler?—I do not know; I am not sufficiently an expert on that point to say.

3362. According to that, you see, the double glass would allow the heat to dissipate more easily from the first glass, and then the cooler rays would strike the second glass, and you would get a second dissipation?—Possibly.

3363. And it might be possible in that case for you to have very light tinted glasses, or almost white glasses, affecting the heat rays?—Yes.

3364. You could have three glasses if you liked?—The moisture of course on the glass is a great trouble.

3365. I am coming to that in a minute. Experimentally it might possibly be found that quite light coloured glasses could be used, provided you got something that took the heat off, because, in your opinion, it is mostly the radiant heat that induces the cataract?—I will not say that it is not the actinic rays of light. I am not sufficiently well up on that particular point to express an opinion.

3366. At all events, according to you, as I understand it, we have got here a practically absolute cure for this disease, if it is insisted upon?—I would not say that the prevention is absolute, but I think it would tend very greatly to minimise the danger.

3367. And, so far as you know from talking to the men or from your own experience, is there any real difficulty in using these glasses?—Not now, since they have got this lacin that they rub on the glasses.

3368. (Dr. Legge.) In this paper which you wrote on this subject three years ago you say you have been unable to find any reference among medical writers to this disease. Have you made any inquiry lately in Germany?—No; but after this paper was written I had inquiries from Germany about it from different men.

3369. You have not heard, for instance, of its occurrence amongst glass-workers in Cologne?—No, I do not know anything about that, nor have I looked the matter up lately, except just within the last few days.

3370. Have you had any cases brought to your notice of a similar cataract arising in other industries where workers are exposed to radiant heat?—No; and from the few inquiries that I made at the time I wrote this paper I could not find that it did occur. I had a little information from Middlesbrough, from the large steel and iron works, where they said they wear dark blue glasses, but they do not look, apparently, into the furnace to anything like the same extent as these bottle-finishers do, because the latter

look five times in two minutes into the furnace when they are making bottles, for a few seconds each time. I have not heard of the disease in any men who work, say, in steel and iron works, or puddlers.

3371. (*Chairman.*) Is it not the case that in the blast furnaces at Middlesbrough the men look into the furnace through a little window of bluish glass?—Yes, I think it is.

3372. And that would make a considerable difference?—Yes, they do use a window there. And there is another man in bottle-works, who has to look into the furnace, and that is the man who feeds the furnace with material, who is called a founder. He is given one of these square glasses to look through, but he does not seem to use it often.

3373. (*Dr. Legge.*) I was thinking more particularly of such operations as electric welding?—I have seen cases of blindness following brilliant electric light.

3374. What is the nature of that blindness?—I have never seen it to cause cataract. It seems to exhaust the retina, but there are no visible changes in the eye so far as I know.

3375. Is that a temporary condition?—Yes, it is 14 Dec. 1906. temporary usually.

3376. Have you ever known it result in permanent blindness?—No.

3377. Nothing to be seen by the ophthalmoscope?—No.

3378. (*Professor Allbutt.*) It does not cause headache?—No, no symptoms.

3379. I mean the incidence of rays from the furnace?—No; these bottle-makers are very prone to chest diseases, but these are due to the dust and frequent chills.

Mr. J. JONES, M.D., examined.

3380. (*Chairman.*) Are you now engaged in medical practice?—I am.

3381. Where?—At Clydach, near Swansea.

3382. And at that place are situated, I believe, the only nickel works in which nickel carbonyl is produced in the course of the manufacture?—That is so.

3383. You have been asked by the firm of manufacturers to medically examine cases which have occurred?—I am medical officer to the workmen of the works.

3384. How many years has this process been in operation?—The process started on May 31st, 1902.

3385. And it is still in use?—It is still in use.

3386. During that time how many cases of nickel carbonyl poisoning have there been?—I find there have been 42 altogether.

3387. How many of them were fatal?—Three.

3388. And of the remainder, have any produced permanent incapacitation?—Not a single case.

3389. They all recover?—They all recover.

3390. After how long a time, as a rule, should you say?—I have taken the trouble to find out the length of incapacitation in all the cases; I am excluding the mild cases, and by mild cases I mean those cases which were not confined to bed at all. Excluding three of the cases—two for reasons which I will give later on, and one for the simple reason that I have no notes about it—I find that there were 25 severe or moderately severe cases, and that the average duration of incapacitation in those cases was 15 days; that is to say, the man was back at work 15 days after the attack.

3391. Have there been any recent fatal cases?—The last fatal case we had was in May, 1903. The last cases we had was a batch of four cases, two years ago last October, in 1904.

3392. Since then you have had no fatal cases?—We have not had a single case.

3393. Either mild, severe, or fatal?—That is so.

3394. To what cause do you attribute the disappearance of the disease?—To the perfection of the apparatus and further knowledge of the effects of this particular gas upon the human system.

3395. Then have you any reason to hope that the disease has now disappeared?—It has disappeared, so far. I may say, as human perfection and machinery will allow of it.

3396. But there can, of course, be no guarantee that there will not be a recrudescence of the disease?—No one can guarantee that the plant will not break down, or the like.

3397. Or that less careful employers might undertake this process of manufacture?—This firm hold the master patent, and it is not likely that we shall have any other manufacturers.

3398. Until the patent has run out?—Until the patent has run out.

3399. Does the disease arise gradually over a period of time, or is it contracted suddenly through some leakage or other defect in the apparatus?—The initial

symptoms of the disease occur at the time of the attack, Mr. J. Jones at the time of the poisoning.

3400. Then it is a sudden poisoning?—It is a sudden poisoning so far as the initial symptoms are concerned, but a certain proportion of the men may work for another shift, say 8 or 9½ hours after being poisoned.

3401. Is the poisoning due to any leakage or defect of the apparatus?—In every case it has been due to defects in the apparatus, or, as in the last batch of cases, in October, 1904, where it was found that one of the cocks connecting one of the big gas receivers had been turned on. Since then all the cocks have been protected, and we have not had any further cases from anything of that kind. The other cases were due either to repairs or else to extensions taking place; but some of the cases undoubtedly were due to defects of the apparatus. At the time when these cases occurred, however, the people who had most to do with it—for instance, Dr. Langer and Mr. Bloomer—did not believe that nickel carbonyl had any deleterious effects upon the human system. Dr. Langer stated at one inquest I remember, in 1903, that he had worked along with Sir James Dewar in a very small laboratory for months on end, and they took not even the ordinary precautions against nickel carbonyl, and that they had run the experimental plant—at least, Dr. Langer had—near Birmingham for seven years, and they had no symptoms there of anything allied to those of nickel carbonyl.

3402. Does he still hold that view?—No.

3403. So that it is established now that the poisoning is due to that gas?—Thoroughly.

3404. But, in your opinion, is it really an accidental poisoning?—It is an accidental poisoning.

3405. In fact, it is not a disease, but an accident?—It is an accident in reality.

3406. Can the ailment be easily diagnosed?—I do not think so.

3407. Not even if you know that the men are employed in that process?—No. The difficulty which is encountered is that they diagnose other diseases as that of nickel carbonyl poisoning.

3408. What other diseases?—I had a case of acute double croupous pneumonia which was diagnosed as a case of nickel carbonyl poisoning, upon which we had a post mortem, and we had litigation about it afterwards. I had another case, of fish poisoning, which I think was reported to the Home Office as nickel carbonyl poisoning, whereas it was due to poisoning by fish—by hake.

3409. What was the course of the legal proceedings of which you spoke just now?—For compensation for loss of husband, brought by the widow.

3410. Under the Workmen's Compensation Act?—Yes.

3411. And that was given against the claimant, was it, on the ground that it was not a case of nickel carbonyl poisoning?—Yes.

3412. Did the Court consider whether, supposing it had been nickel carbonyl poisoning, compensation

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Mr. J. Jones

M.D.

Mr. J. Jones, ought to have been refused on the ground that it was not an accident?—I do not quite follow the question.

14 Dec. 1906. 3413. Did the Court also consider the point whether nickel carbonyl poisoning was an accident within the meaning of the Workmen's Compensation Act?—They did not take it into consideration, but I think they would have given compensation if they had. I may mention that the company have compensated in all their fatal cases.

3414. (Dr. Legge.) What are the symptoms produced by inhalation of nickel carbonyl?—You get the initial symptoms which come on within, I should think, a few minutes after the inhalation of the gas. You get the ordinary symptoms, such as frontal headache, giddiness, sensation of drunkenness, nausea or vomiting, and you get pain in the epigastrium, or, more commonly, in the post sternal region.

3415. And later, what are the developments?—I generally see the cases from 12 to 18 hours after the initial symptoms have appeared. Then the headache persists, but it is not so intense as during the few minutes after the seizure; there is nausea, anorexia (loss of appetite), and sleeplessness; but above all they complain of pain behind the sternum or in the epigastrium, which is rendered much worse by any exertion; simply turning over in bed or sitting up increases the pain, or coughing, laughing, or sneezing. As long as the patient is sitting down quiet at this time there is no dyspnoea, but as soon as ever the patient moves dyspnoea becomes evident. Later, about the second day, the dyspnoea is present, even when the patient is at rest, and gradually increases until the fifth or sixth day, when symptoms of recovery set in, and the breathing becomes less rapid. In addition to the dyspnoea, I find that the temperature for the first 24 or 36 hours is subnormal, by the second day the temperature becomes normal; then it gradually rises until about the fifth or sixth day, but never reaches any great height. Even the severe cases which recovered, and two out of the three fatal cases, did not register a temperature above 102. On the average the temperature would be about 101 Fahrenheit. The temperature also decreases and gets lowered about the fifth or sixth day. The pulse at the time of the initial symptoms is very rapid, running up to 120 and 140; by the end of 24 hours the pulse will be considerably lowered—it may reach down to 100. From this time on it gradually increases, till about the fifth or sixth day it may reach 140. There is no irregularity of pulse at any time. The hearing is unaffected, and no noises are complained of. The skin, as a rule, is pale throughout.

3416. Is there any resemblance to the condition of the skin in carbon-monoxide poisoning?—It is pale, but there is this exception, that you do not get the cherry lips. In nickel carbonyl you always get cyanosis of the lips and ears, which becomes evident first about the end of 24 hours, and gradually increases in intensity *pari passu* with rapidity of respiration. Cough is generally absent in these cases, and when present it is

always dry, infrequent, and trachial in character. Expectoration was present in about a sixth of the severe and moderately severe cases, and then the sputum was found small in quantity and was composed simply of clear mucus. The pupils of the eye are slightly dilated, but react to light and accommodation. Sleeplessness persists during the acute stage, but the patients attribute that to the condition of their chests. So far as the physical signs are concerned, the movements of the chest are rapid and equal on both sides. There is no local decrease of movement, and there is no appreciable dulness. About the second day the respiratory murmur shows some alteration in character, the respiratory murmur is prolonged and slightly harsh, followed by a normal interval and a shorter expiratory murmur. This change of character of breathing is at first only noticed in the intra-scapular region; as the case progresses it becomes more general. In the fatal cases, at least in two of them, auscultatory signs of consolidation were evident all over the lungs, with, in places, slight crepitations. By the fourth day the condition of the heart shows dilatation. With regard to the digestive apparatus, there is anorexia, there is no great thirst, but there is marked constipation. The urine is decreased in quantity, but there is no blood, no albumen, and no sugar. The reflexes are normal throughout. There are no twitchings, no tremors, no retraction of head and neck, and no delirium, and the intellect remains clear until within a few hours of death.

3417. You have given the average duration of cases; do you remember what the extremes were?—In compiling my average I excluded two cases. One case I excluded, in which the duration was 22 days, on account of the fact that the convalescence was protracted owing to chronic bronchitis and emphysema, from which the patient already suffered—a man aged 51.

3418. Is that the longest duration?—No, I have excluded another case, the duration of which was 46 days, for the simple reason that the man had a streptococcal sore throat and a patch of broncho-pneumonia following it. Then, again, of the uncomplicated cases, cases pure and simple, the longest duration was 22 days, and the next to that 21 days.

3419. The firm, I believe, have carried out some experiments on the poisonous character of nickel carbonyl. Have they been published?—No, not yet; they are still at work upon it.

3420. Would you briefly state the nature of the exhaust ventilation which is employed in these cases? Is it natural ventilation or is it an artificial system?—If, say, repairs are wanted to be done, or there is a stoppage in a certain part of the plant, all the gas enclosed in this particular part of the plant, which is first disconnected from the main part of the plant, is blown out, and its place taken by inert gas—that is to say, the place of the nickel carbonyl is taken by inert gas. The gas is turned into the open air, and there burnt.

3421. Have they a system of mechanical ventilation throughout the works now?—Yes.

Mr. D. ISHERWOOD, examined.

Mr. D. 3422. (Chairman.) You are, I believe, secretary of the Shuttle Makers' Society?—I am.

3423. And several of your members, we understand, have been suffering of late from a form of poisoning which is attributed to the use of certain African boxwoods?—It has been so.

3424. Have there been many cases of that poisoning?—Yes. I might say in regard to the effects from that wood that practically every man, or 90 per cent. of the men, who work at it for any considerable time feel the effects of it.

3425. What are the effects of it?—We feel the effects of it in several ways. For instance, I work among it myself, and I can give you the effects on myself. I am one who did not feel it at the beginning when it was introduced, but I find it out as I go on working, and the effects I feel are in the eyes and in the head, but the worst effects I have seen are in regard to men having to gasp—having to stick to the

bench and fight for breath. I have seen men younger than myself sticking to bench and fighting in that way (*describing the same*) to get breath. Sometimes we have to take them out at the back doors into the fresh air.

3426. Do any of your men have to give up work, either for a short or long period, on account of this poisoning?—Yes, many of them. We have had one, since Dr. Legge visited us, return back to work. He worked a few days on the cornel wood, what is termed American dog-wood, and then he was put on to this special kind of wood, this West African boxwood, as it is termed, where he worked for about an hour, and then we had to remove him to the back door into the street. Since then he has had to give up the occupation altogether, and is now working in a cotton mill.

3427. Have you had any fatal cases?—You see, the case is a very difficult one, for this simple reason, that the men who have been affected by this kind of wood

have gone to ordinary practitioners in the town, and I take it the local doctors did not understand this wood, or know anything about it; in fact, it was only through the men being continually affected by this wood, and having to go to doctors and stopping off work, that we had it analysed. That caused us to have a suspicion that there was something wrong with it.

3428. Is this wood used for other purposes besides shuttle-making?—It has only been used latterly—for the last 11 years; but in the beginning, say 11 years ago, there were only one or two mills that worked a little of it, until it has gradually got by itself. Now with the Persimmon wood, the Persian box-wood being so dear, this wood has taken its place, and is being used more extensively to-day than it was during all the 11 years, and it is very probable that practically one-half of the shutles turned out will be made of this wood, because it takes the place of the Persian box-wood, because it is cheaper.

3429. It is not used in cabinet-making, so far as you are aware?—I could not answer for that. I am not in the cabinet industry at all.

3430. (*Mr. Cunynghame.*) You said that you had seen many men leaning against a bench fighting for breath?—Yes.

3431. Are you sure that that is due to that particular poisonous wood, and not to other causes—to dust in general, for instance. If anybody asked you, how do you show that that gasping for breath is due to that poisonous wood and not to something else, how would you answer?—I should answer in this way, that never in all my time shuttle-making have I seen men affected in that manner. I have never seen them affected except in cases where they have been working four or five hours, or two or three hours, on that class of wood. But I say this, that a man who has been affected two or three times with it is soon affected again. In the case I have mentioned of the man who has been off work, and had a bad attack of it, on his returning back to work he was sooner affected with it again than a man would be that had not had a first attack. I find that the more a man becomes affected, the less it takes to affect him again.

3432. Have you seen a good many men affected in this way yourself; is it your own experience that you are giving us, or is it what is said generally?—I have seen it myself.

3433. You have seen a good many men affected in this way?—Yes, I have worked in the shop since I was 17 years old, and I have seen the wood introduced into that shop, and I have seen the men affected in that shop.

3434. You said that your Union began to inquire into the matter when your attention was drawn to it, and that you had had the wood analysed. What did the people report to you as to how they had analysed it, for instance; do you know what they did; did they poison animals with it?—Yes, I have the books with me.

3435. What animals did they use, do you know?—I attended the University at Liverpool on about four occasions. Professor Harvey Gibson was the analyst that analysed it. I supplied him with the wood—I mean pieces of wood and sawdust from that class of wood. He reported to me that he had discovered an alkali, and that they had experimented on animals—cats, guinea-pigs, and monkeys, and he reported to me that they had all died. I believe the death was resulting from syncope. I have got the book he forwarded on to me, which gives one or two charts in regard to the heart beats.

3436. You do not know how they tested it on the cats; perhaps we shall hear that from someone else?—No, I did not see the operation.

3437. (*Chairman.*) Does your society wish to submit any medical evidence to this Committee?—I would like to point out that we are only a small society at the present time. We have about 300 in our society, and the question for us was whether we had the men suitable to send here to represent us, for this simple reason, that we scarcely had a doctor that understood or had any idea that a man was suffering from any kind of poisoning from this wood.

3438. You have read Dr. Legge's report on this subject?—We have had Dr. Legge's report, and in his

report he gives a case which I think would supply all information—and in regard to Dr. Hamilton.

3439. Then your society does not desire to submit any medical evidence, in addition to that which is before the Committee in Dr. Legge's report and in the evidence of Dr. Hamilton?—We are at a loss, you see, where to find a doctor who has known such a case. I believe when Dr. Legge went round to the local doctors they had scarcely had any idea that he was using any kind of poison; they simply, in our estimation, treated it as a disease, such as asthma or bronchitis, that affected the chest from the ordinary dust, probably never dreaming that there was a certain class of wood which contained this poison. I would also like to state that since Dr. Legge made his examination we have had a dust exhaust applied. I remember stating to Dr. Legge that I thought it was an utter impossibility in some kind of this work to put an exhaust in that would take away this dust. I find from inquiry in all the shops, and also from examination in the shop I am working in, that in certain classes of machinery, such as dressing up, where the whole machinery runs one road and cuts one road, it takes away the loose dust that comes to the mouth of the exhaust; but in the body inside, where you have cutters which vary from nine inches in diameter to an inch, rushing round about 4,500 revolutions per minute, and which is throwing sawdust away from where the fan is, at the speed at which it throws the dust we find it an utter impossibility for the exhaust to get the dust or take it away. The dust which falls into a pit, you might say, goes away; but the dust that flies this way, or spreads out in different shapes, as it does, it does not take away, and it is almost an utter impossibility to have an exhaust in such a position that we could work, that would take the dust away that comes flying from the cutter that is revolving between 4,000 and 5,000 revolutions per minute.

3440. Have there been any cases of this poisoning within your own knowledge since these exhausts were required to be applied?—Yes; we have a case at the present time of a man who has been sent to the Blackburn Infirmary. It is rather a strange case, and I mention it in regard to what Professor Harvey Gibson pointed out to me. The man has been handling this wood very extensively, and he has broken out all over; and in another case, from the same workshop, the doctor has sent some expectoration from him to be examined, as he is of opinion that there is a certain quantity of poison in it. That is a case which has only lately occurred.

3441. Were there exhausts applied to the machinery where that man was working?—Yes.

3442. For how long a time?—I think the exhaust has been in for six or eight months.

3443. (*Professor Allbutt.*) How many men do you think suffer on an average? Would you say that one in three, or more than that, suffer on the average from this dust?—From the effects of this wood?

3444. Some of them do not suffer, I suppose?—I should say nine out of every ten that work at it.

3445. You mean practically that everybody suffers from it, more or less, who is occupied with it?—Yes.

3446. That is if there is no exhaust?—Yes, and if there is an exhaust.

3447. I am supposing first that there is no exhaust?—But I should like to point out that they are not in all cases as bad as a man having to gasp for breath, but they either suffer from their eyes running and nose running, and a lot of them complain terribly about pain in the forehead, headache, and sleeplessness. I have known myself, when I have been working for four hours, go home, and the only desire I have got—

3448. Have you ever worked with this wood yourself?—Yes; I have worked at it ever since it was introduced. I have known myself when I have gone home at night I have been the same as if I had been working among some kind of drug or suffering from some kind of liquor or drunkenness. The one thing I want is I have the feeling that I want to drink something, the same as having a pint or two of beer, and then fall asleep. I feel as if I was dosy, and have no desire to do anything, only to sleep. I have sometimes felt at my head to see if it is bigger than it should be.

3449. I gather from you then that nobody is abso-

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lutely immune; that everybody would suffer more or less if there were no exhaust?—Yes.

3450. And instead of getting used to it they become more susceptible and less able to stand against it?—That is the case.

3451. What degree of incapacity does it produce—inability to go to work at all? Supposing a man has a series of relapses extending, say, over six or twelve months, does that make him quite incapable of work?—In that case he naturally has to give over with it. We have had one man in that case.

3452. I understand that the intervals between attacks get shorter and shorter?—Yes.

3453. Will they get so short that he could not work with it at all?—I believe so.

3454. Within what time?—I cannot say.

3455. I quite understand from you that, even where there is an exhaust, the rapidity of the particles of dust from the wheel may be such that the exhaust cannot catch them up?—Exactly; that is the fact.

3456. I suppose there could be no pane of glass inserted; you could not work with a glass screen?—No.

3457. Have you ever tried any kind of handkerchief or respirator over your mouth?—In regard to the man I have already described, he did try to put something over his mouth with some cotton in it, but he could not breathe as freely.

3458. It is not a laborious occupation, is it?—Yes, it is pretty hard. You have to cut this very hard kind of wood under the cutters, and if you do not grip it firmly with both hands, and have got your knee against the gangtree, as we term it, if you should slip or chock it you might cut your finger off.

3459. It is a fixed attitude?—Yes.

3460. Therefore it is not what we should call very laborious. You have told us, but perhaps you will repeat it, how it is that a respirator is of no service. Can you not work with it on?—We have never thoroughly tried one to cover the mouth and nose. I have seen this man I have mentioned, Allen, try to wear something, but he could not get his breath thoroughly through it, and it affected him through it. I do not say it was a proper medical respirator or one that had been advised by a doctor. I simply take it that it was a thing he tried himself—a kind of pad.

3461. A pocket-handkerchief?—It was a piece of wadding or cotton.

3462. The disease you say affects the eyes as well as the nose and mouth?—Yes, the eyes run; they become what you might term inflamed and watery, and the nose runs and is red, something the same as a man having a bad cold.

3463. What the effect of the poison might be in itself if it were taken in by the eye you could not tell? It is through the nose and mouth chiefly, you think, that the effect is produced?—Yes, the greatest effects I find myself are this headache and this tightness of breathing. Sometimes, for instance, you seem as if you cannot get your breath; you feel a tightness, the same as if your chest was swelled, or the lungs would not let out the air you have in you. That, I find, is the worst effect.

3464. I suppose you could not say whether that is due to the mere inhaling of fine dust, or whether it is due to the effect of the poison on the whole system—that is a medical question?—No, I could not. But I do find this—that a man who works for 12 months on this other kind of wood is never affected, and then, if he works on this kind of wood for a week, you find he is affected. If you take him off it for a few days' rest, or a week's rest, and he comes back on the ordinary wood, then the man is all right again; but when you put him back on to this kind of wood, the man starts and is affected again. That was one of the causes that gave us a suspicion that there was something wrong with this class of wood. I noticed it myself. I watched it, and it was I who advised my committee that we should have it analysed to see what was the cause.

3465. I will ask you, I think, only one more question, because I do not want to trouble you with medical questions, but this one I want to put to you. A man is put upon this wood, and it is very important, of course, that he should be able to work

it, he tries, and tries, and tries again, until, after some months, he is unable to do it at all. Is that so?—Yes.

3466. Is it then within your experience that any permanent injury has been done to that man; or if he changed to other woods would he get quite well again?—That is rather a strange question. We have scarcely had time to try it, or see its results. We have one man now who has had to leave the industry and go to a cotton mill. As to whether he will be able to manage in that industry or not I cannot tell.

3467. You have not had enough experience to say?—No.

3468. (Dr. Legge.) I do not know that you have mentioned the particular kind of wood that it is. What do you call the wood?—It is what we term the West African boxwood, and I find, of course, it gets different names. If you gentlemen would like to see a bit, I have some small samples here.

3469. But what other kinds of boxwood are there? You mentioned Persian wood. Is there any other African boxwood besides this West African boxwood?—I am not aware. There used to be what they call Mambralla boxwood, and there was the East Indian boxwood, but they mostly gave over using it, because it did not suit their purposes.

3470. Did the East Indian boxwood cause illness?—That was used, I might say, before my time.

3471. You do not know about it?—No.

3472. What is Knysna boxwood?—That is the name the masters give this, or West African boxwood. I see Professor Gibson states that it is commonly in some places called West African satin-wood. I am at a loss to get to know what the proper name is.

3473. Do you know the South African boxwood? It was from South African boxwood that Professor Harvey Gibson separated this alkaloid?—Yes.

3474. And is that quite a different wood from West African boxwood?—No, we do not know the difference at all. *This (producing samples)* is all the same kind of wood, you see, only in different shades.

3475. Is it according to the seasoning that it changes colour?—No, you might get these two off the same tree; it might grow as straight as that off the same tree. It seems as if *this* portion had more sap than the other one, and it is generally *this* kind that we feel the most effects from.

3476. The bright specimen?—No, the dark yellow.

3477. Does this wood make a good shuttle?—Yes.

3478. Is that why it is used?—To use other boxwood is dearer. This is very cheap, and it is soft; and, not only that, it satisfies the cotton manufacturers that it is a good substitute for boxwood.

3479. (Mr. Cunynghame.) Do they want a heavy wood, then? Why should you not use beech?—The Cornel and Persimmon wood do equally as well; but the boxwood has got so dear, and this kind is quite as good.

3480. Why would not beech do?—I could not say. But we have two or three kinds of wood that we do besides this. Why they want to use this is because it is cheaper, and it takes the place of boxwood. It is being substituted for boxwood.

3481. (Professor Allbutt.) Is it cheaper than all those other woods?—Yes.

3482. (Dr. Legge.) But the manufacturer will tell you that it makes a good shuttle?—Yes; that means that it makes a good shuttle—that it is soft to work, and it does not use his cutters.

3483. But it takes a good polish?—Yes; that is so much the better for his sale, and he gets a fair price for the wood. And it is simply deceiving the cotton manufacturer into the belief that it is as good as boxwood.

3484. How long does it last, compared with dogwood?—About the same length.

3485. What is the ordinary life of a shuffle?—That would depend upon the wear-and-tear of the machine that it was running in. If the loom was in good order, it might last longer than it would if the loom was in bad order.

3486. You work in Blackburn, I think?—Yes.

3487. How many members of your Association are there in Blackburn?—119.

3488. Have you a sick fund in connection with your Amalgamated Society?—No.

3489. When I was in Blackburn, I think there were four men who were incapacitated who had had to take to other work?—Yes.

3490. With the exception of this one other man that you have mentioned since, who has gone to a cotton-mill, are there any others, do you know, who have had to change their employment?—I do not think we have had any others who have changed their employment, only those who have left the trade and gone as publicans—but not through that class of wood.

3491. So that, if one said that six men had had to change their employment because of the effects of this wood, in Blackburn, one would be within the mark?—Yes. But I would like to point out that our Society itself has made objection to work above a certain quantity; and I might say that we are going to try and see if we cannot force our masters either to substitute another class of wood for it or to make the shuttles from American dogwood. We have now given our masters notice that, from the 1st of next September (1907), we

shall refuse to work that class of wood. We are so confident, we have all felt the effects so much (even our foremen have seen it, and know it), that we do contend it is not right, seeing that they cannot put a suitable exhaust in—which we believe is almost an utter impossibility. And now our Society has determined to try and stop that wood.

3492. But you agree, do you not, that if the wood is used only to a small extent—say, once a week—as compared with the use of other wood, the symptoms do not occur?—That depends on the time. If you work two hours, and only two hours, per week, probably you would not have got a sufficient amount of it to affect you much. But there is a man at the present time in my workshop whose eyes would begin to run if he was working there and the saws began to cut that wood.

3493. (*Professor Allbutt.*) How far away is that?—I should think ten or twelve yards away. As soon as the dust begins to circulate through.

3494. Has Spanish chestnut ever been used for this purpose?—I do not think so. Not that I can remember.

Mr. W. F. DEARDEN, M.R.C.S., L.R.C.P., examined.

3495. (*Chairman.*) You, I believe, are a medical man in practice in Manchester?—That is so.

3496. And you are also a certifying surgeon under the Factory Acts?—Yes.

3497. You have had experience of the effects of anilin poisoning on workpeople employed in dye-works?—Yes.

3498. In what processes does the poisoning from aniline take place?—In the dying of what is called “fast blacks.”

3499. Only in that process?—Only in that process.

3500. To what cause is the poisoning due?—To inhaling the vapour of anilin, and, to a lesser degree, from absorption through the skin.

3501. And this vapour is not produced in any other process in dye-works?—Not to my knowledge. I might say that it is not.

3502. What symptoms does it give rise to?—The main characteristic symptoms are symptoms of cyanosis—that is, paleness, lividity of countenance, blueness of the lips, and blueness of the finger-nails. Besides these, you get symptoms of dyspnoea, or defective breathing, intense cyanosis, with giddiness, shivering, muscular relaxation, small and intermittent pulse, drowsiness, dilated pupils, and sometimes loss of consciousness. The functions of the bladder and rectum may be affected. You may also get temporary blindness from paralysis of the optic nerve. The symptoms are similar to those from poisoning by di-nitro-benzol, and are also produced in more or less degree from taking over-doses of acetanilide in ordinary medical practice. In the case of dyers, the skin of the hands is saturated with the anilin hydrochloride, and this produces a yellow stain on common wood-pulp paper being handled by them.

3503. Are men incapacitated from work for any considerable length of time?—It is difficult to get to know that. I have had one particular case in my experience where the incapacitation was undoubtedly due to this poisoning, and I am quite satisfied that other people have been away from work for moderately lengthy periods from the same cause. But the difficulty is this: If a man is away from poisoning from a trade process, he would not like to hand in a certificate to his employer to that effect.

3504. Why not?—He would be afraid for his situation—that is the case exactly.

3505. Have you had any cases of men being incapacitated for periods of months through this poisoning?—No. In the particular cases that I attended in private practice, where I had a very excellent opportunity of watching the effects, the man would be off work for probably about a fortnight, and perhaps three weeks on occasion. He would resume his work, and a few months afterwards he might be laid up again for perhaps a similar period.

3506. But always for a period of either one, two, or three weeks?—Yes.

3507. Have you ever had any fatal cases?—I have no knowledge of any fatal cases, but there are very serious effects produced sometimes in one part of the process—that is, where the man goes into what is called the “ager,” or ageing-room. You get more sudden and pronounced toxic effects there.

3508. That is from the same vapour?—Yes, and modifications of it. It is almost impossible to tell what vapours are produced in this ageing machine. The anilin is oxydised there, and some very complicated chemical vapours are formed, which are not actually known; and that is where the dye is struck. The oxidation of anilin takes place there, and this forms the black. The cloth is a yellowish shade before it goes into the “ager.”

3509. The processes in the ager are automatic, as a rule, are they not?—Yes.

3510. And it is only in the case of a breakdown that a man has to go in?—Yes, and then the man might become unconscious and be dragged out. It is a comparatively common occurrence, the man being taken into the open air to come round.

3511. Is he incapacitated from working?—Yes, perhaps, for several days in such case; but, so far as I understand, he has not the prolonged absence from work you get from the slower poisoning.

3512. The symptoms are something like those of asphyxiation, I suppose?—Practically. You get the lividity more pronounced and the blueness.

3513. But the danger of that is well understood, and the men would go into the ager as a man would go into the dangerous part of a mine or a house on fire?—They should do, but they are very careless; they go in without respirators or anything protective sometimes.

3514. Do men often go into the ager without any ill effects occurring?—Yes, if they place a cloth over their mouths, and are very quick in going in and out.

3515. A man would never be incapacitated for a week, would he, from poisoning of that kind?—That is possible. I do not know of a case of incapacitation for a week in my personal experience.

3516. The other form of poisoning from anilin which you were discussing first is of gradual development, is it not?—Yes; a man would be working at the process for some time before he would be really actually laid up ill.

3517. Can you diagnose with certainty this form of anilin poisoning?—Yes, I could, I think; but it would probably be a difficult thing for anyone who was not aware of the effects of anilin in dye works. It might not strike a practitioner unless he was aware of the poisonous effects of anilin in dye works, and the possibility of workmen suffering from such.

3518. If you had a man in a hospital, without knowing the history of his case, suffering from certain

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employed in processes in which either anilin is used suffering from aniline poisoning?—Well, the symptoms are similar to those produced by di-nitro-benzol poisoning, so that by enquiry, of course, you would find out what the man had been accustomed to work at. And, of course, there is one particular thing that would strike me (I mention it in my abstract), that is, that a man in handling a newspaper turns it yellow—that is a proof that the man has been working in aniline.

3519. Do you come across similar symptoms from any other cause in ordinary practice amongst men not employed in processes in which either anilin is used or di-nitro-benzol?—The only thing that it could possibly be confused with, I think, would be some cases of heart disease and some cases of asthma. In a case which I had, when I was first called to see the man the symptoms were very like asthma, there being great difficulty of breathing; but there was a particular blueness that made me ask him questions. It was not exactly like anything I had seen in heart disease, or in ordinary asthma.

3520. Then are there specific characteristic symptoms which would enable a medical man experienced in such cases to say definitely and with certainty that a man with those symptoms was suffering from a disease due to his employment?—Certainly.

3521. (*Professor Allbutt.*) In what particular parts of the process are the men engaged of whom you are speaking? Are you speaking of all the men engaged in the works, or only of those who are engaged in a particular part of the process?—I am only speaking of those engaged in this particular process.

3522. In which particular process?—In dyeing these "fast blacks."

3523. But what are the men actually doing at the time?—They are mixing the dye solution, and attending to the machine. There are two methods of making this solution; some firms employ anilin oil, adding hydrochloric acid to form the salt.

3524. Are the men necessarily in the same apartment as that mixing?—Not if carried out in the drug room. It has, however, been common to carry on the mixing in the same room as the rest of the process.

3525. We have been told that they are not necessarily in the same apartment?—Not now, perhaps, since the new Regulations; those have made a great deal of difference, of course. They were very careless before the new Regulations were issued.

3526. And with the Regulations the danger in the mixing part of the process might be got rid of?—The new Regulations have minimised the danger a great deal, so with care there should now be very little risk.

3527. What are the particular incidents against which it would be most difficult to protect the man by regulation?—I scarcely think any of them. I think it is quite possible for these risky incidents to be done away with altogether, if the men will only observe the Regulations, as well as the employers; that is the great difficulty.

3528. We saw at Bradford, I think unquestionably as far as I could judge, a man suffering from acute poisoning from one of these series of products. He was working at what is called the "egg," which does not itself contain these products; but he was perhaps eight or ten yards from where fumes were coming off from some other process which did contain, or presumably contained, these products, and it alleged that this man, being ten yards off, suffered from acute poisoning. Would that be within your experience?—I think it quite possible if it was in a very heated room, and if the crude anilin oil was used (that is in contradistinction to using anilin salt) that there would be sufficient fumes to cause the symptoms.

3529. I will leave that subject, as Dr. Legge will kindly ask you about it. Acute poisoning, of course, does not come much within your experience; you have never seen a case of acute poisoning—you have no vivid recollection of it?—No, not of anilin poisoning.

3530. The next thing I should like to ask you is about the anæmia. At the time when the symptoms of poisoning are obvious, when it is sub-acute, you have

these changes of complexion, and so forth, of which you have spoken?—Yes.

3531. Is it within your experience that all these men, or the large majority of them, engaged actively in this sort of work become permanently, so to speak, anæmic, so that, on examining the eye, or the gums, or even meeting a man in the street, you would be able to say from his anæmic appearance that he had probably worked in these fumes?—Not unless I had more information to go upon, I think.

3532. I might put it a little more broadly, then. In the case of men of whom you are speaking, is there any persistent, in the sense of permanent, anæmia?—Yes, whilst they continue working at the process; but if they give it up they get right again.

3533. You have not examined the blood of any of these men, I suppose?—No.

3534. The symptoms pass off completely, I think? the symptoms gradually disappear; that is to say, in all these cases, unless by some accident, there is complete recovery?—Yes; but it would be necessary in some cases to give up the work permanently if there were to be no recurrence.

3535. Do the men become more susceptible after each attack?—Yes; but I believe that would not operate to any great extent where preventive measures are taken against recurrence.

3536. But if a man changes his employment, for example, he would get perfectly well, generally speaking?—Yes.

3537. There is one point that you reserved—that is, dilatation of the heart. That, you think, might entail permanent incapacity?—Yes, certainly it would.

3538. You have seen cases of that, too?—Yes.

3539. There the heart has become poisoned in such a way that it does not within a reasonable time recover?—Yes, that would be permanent, though all the other symptoms had disappeared.

3540. That, I gather from your *précis*, would be of very rare occurrence?—Yes, very rare.

3541. Does paralysis of the optic nerve mean atrophy of the optic nerve?—No, that would only be a temporary symptom from a disturbance of the circulation.

3542. You are not contemplating disease of the eye?—No.

3543. (*Dr. Legge.*) Have you had experience of the use of di-nitro-benzol in factories?—No.

3544. Your experience is limited to anilin black dyeing?—Yes.

3546. Is the aniline black dyeing carried on in Manchester exactly in the same way as it is in Bradford by the Bradford Dyers' Association?—Yes.

3547. You have branches in your district?—Yes. This Bradford process originated in my district, as a matter of fact.

3549. Your only knowledge is of calico cloth that passes through anilin oil or anilin hydro-chloride, is aged, and then treated with bi-chromate of potash?—Yes.

3550. You referred to the symptoms which you say here are associated with di-nitro-benzol. Have you ever seen a case of di-nitro-benzol poisoning?—No, but I have read Dr. White's papers on the subject.

3551. Where does he get his experience from?—From the manufacture of explosives.

3552. What explosives?—Roburite, I believe.

3553. Are the symptoms of anilin poisoning, do you think, as pronounced as those that you get from handling or coming into contact with di-nitro-benzol?—It depends upon the severity of the individual case.

3554. But from what you have read of Dr. Prosser White's experience, what should you say? As I understand, you, personally, have only had to treat one case?—Yes; I have seen others, of course. But I do not think aniline black dyeing is so serious a matter as this manufacture of explosives.

3555. You do not think that the poisoning from aniline black dyeing is so serious as that from the manufacture of explosives?—No.

3556. But the symptoms, nevertheless, are comparable?—Yes.

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3557. What is anilin, chemically speaking?—It is phenylamine.

3559. Would it be included under the term nitro and amido derivatives of benzene? Would that term include all those substances producing these vapours?—I should say so.

3560. Have you experience of poisoning arising from the salt—hydro-chloride of anilin?—It is a difficult thing to say whether the poison has arisen from the salt or from anilin oil.

3561. That is my point?—Because in some places where the anilin salt is used to produce the black they have a trick of adding some anilin oil to the mixture, and that passes through all the processes, of course, with the aniline chloride; that is to say, the cloth is impregnated with the anilin oil along with the anilin chloride. Of course, the aniline oil is by a long way the more dangerous. Aniline salt is certainly very little dangerous, though I believe absorption of this through the skin can produce symptoms.

3562. Have you noticed any effects on the skin of workers with anilin or anilin hydro-chloride?—The skin gets saturated.

3563. But is there any lesion of the skin?—No, there is no lesion at all; it is simply saturated with chloride of anilin.

3564. Have you noticed any effects from the use of chromic acid, or bi-chromate of potash, in the process of anilin dyeing?—Yes—that is the fixing of the black afterwards. After it comes from the ager it is fixed or made fast.

3565. What is the effect produced?—Sores on the hand by handling the cloth; men will handle the cloth to keep it straight; they apparently cannot help doing it.

3566. Can you recognise the particular effect produced on the skin by chromic acid?—You associate the two naturally if you know that the man has got these ulcerations and works at the process.

3567. Does it differ from eczema?—The sores are deeper.

3568. Have you had to treat these ulcers yourself?—No; I do not think I ever had to treat them.

3570. Have you never seen simple diffused eczema on the backs of the hands?—No; not that I could associate with the chromic of potash.

3571. (*Chairman.*) Do these diseases of anilin poisoning and chrome ulceration occur in other industries besides dye-works?—In the manufacture of anilin and anilin salt.

3572. And the chrome ulceration?—Yes, in the manufacture of chromate of potash and soda.

3573. Have you had experience of any such cases?—No.

3574. (*Mr. Cunynghame.*) With regard to chrome poisoning, I think one or two of the witnesses who have appeared before us treated the chrome ulceration as rather a small thing. What is your general opinion about it?—I should treat it as rather a small thing in this particular process.

3575. I was going to ask: Would you dignify it with the name of an industrial poison? I do not want to lead you either way, I want merely your opinion. In one sense, everything may be a poison?—That is so; but I do not think it is of that supreme importance in so far as concerns this particular process.

3576. (*Chairman.*) For how long would it incapacitate a man in bad cases?—In my opinion, a man would have to be absolutely careless to get his hand bad from it.

3577. But, apart from his being careless, for how long a period would it incapacitate a man in bad cases?—It would incapacitate him for several weeks.

3578. (*Mr. Cunynghame.*) In a bad case?—Yes.

3579. Then probably what I was alluding to as a slight ordinary case, was what the witnesses were alluding to when they rather minimised its effect?—Yes.

3580. The severe cases would be comparatively rare, I suppose?—Very rare. Only a small ulceration is the rule; and when a man finds that, he takes care of

it, and gets it well. All the men themselves know the risk of it; they know it is injurious to the hands.

3581. (*Chairman.*) Let us turn now to the subject of the effects of nitrous fumes. You have had experience of cases of that?—Yes.

3582. Also in dye-works?—Yes, in dye-works.

3583. And in printing works as well?—Dyeing works and printing works.

3584. Anilin poisoning does not occur in printing works, does it?—I cannot say that anilin poisoning does. Anilin dye is used to a certain extent; but I would not like to apply my remarks to printing works at all without more knowledge.

3585. But poisoning by nitrous fumes distinctly does apply to printing works as well?—Yes.

3586. Are the symptoms there gradual, or do they arise suddenly, as though from accident?—They are mostly gradual in dye and print works. They are not very characteristic. They are loss of appetite, sickness, vomiting, sleepiness, difficulty of breathing, lassitude, muscular weakness, and prostration.

3587. Would a man who worked in the processes in which he is exposed to nitrous fumes for some time show these symptoms?—Yes.

3588. You do not mean in the case of a man suddenly being overcome by the effects of the fumes?—Not with this particular process. I can tell you of a case subsequently, from another process of dye-making; but not from the process I am referring to, of dyeing what are called paranitraniline reds—that is, the modern substitute for Turkey-red.

3589. There the poisoning from nitrous fumes is a gradual development?—Yes.

3590. But there are other processes in dye-works in which a man may suddenly be fumed?—My experience of a man being suddenly fumed was at a chemical works, where they manufacture a fast claret dye; but probably something of a similar nature may occur in dye works.

3591. Was that the result of some defect in the apparatus?—In this particular case it was due to careless handling.

3592. But you only know of one such case?—Only one in my personal experience. It was a well-marked case of acute poisoning from nitrous fumes.

3593. Do you get many cases of poisoning from nitrous fumes in men employed in dyeing and printing cotton piece-goods?—This was in cotton piece-goods.

3594. Do you get many such cases?—Not personally; though from inquiries I have every reason to believe that such are of frequent occurrence.

3595. Do they incapacitate from work a long period sometimes?—I should say two or three weeks would be the ordinary time.

3596. You never get any fatal cases?—Not from dye-works.

3597. Can you diagnose this disease with certainty?—No, I should not say so. You would require to know what the man was working at—to diagnose it from the history, as much as anything else. The symptoms are not characteristic.

3598. But if you knew the process at which the man was at work, and he presented certain symptoms, could you say practically with certainty that his symptoms were the result of working in that process?—Yes.

3599. Would there be risk of cases occurring in which the symptoms were diagnosed as symptoms of industrial poisoning, which are really due to some completely different cause?—Yes; there is a possibility, certainly. There is the chance of a man representing himself as suffering from the effects of his work, when he is probably suffering from something else.

3600. Is that a serious risk?—I should not consider it a very serious risk if medical men understood the process.

3601. A really expert medical man could differentiate?—I think so.

3602. Now we might turn to the india-rubber works. In India-rubber works, do the workers sometimes suffer from the effects of carbon bi-sulphide fumes?—Yes.

3603. Have you had cases of that kind under your observation?—Only in a very slight degree. The

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only symptoms I have noted are symptoms of sleeplessness and headache when the weather is particularly heavy, and the fumes do not get away from the apparatus very well. These soon disappear if the men go out into the fresh air.

3604. Have you ever heard of persons being incapacitated from working by being exposed to carbon bi-sulphide fumes?—Yes; there is one man I periodically examine—a man who has been working at the process for 20 years. Ten years ago he distinctly suffered (from the history) from peripheral neuritis. He was taken off his feet for 18 months.

3605. And was it definitely due to this process?—Yes, it was assigned to it, and at that time, he tells me, he often used to feel drunk without having had anything to drink. That is one of the effects, of course, of carbon bi-sulphide; it is a good way of expressing it, though it sounds a little broad. I ought to say that that man has quite recovered. I have been very particular in examining him on several occasions to see whether there is any sign of neuritis now, and there is not.

3606. Is that a specific symptom which results from this poisoning?—Yes, one of them.

3607. Have you had any other cases of the kind under your observation?—No.

3608. Are there many indiarubber works in your district?—I have two indiarubber works in my district. There are a number of them in Manchester.

3609. How many men are exposed to the danger of this disease?—At the present time I have got six men who are working at this process in the two works. sometimes I have eight.

3610. Have you experience of this disease in other districts?—No. I might say that the process I have experience of is a process of vulcanising proofed cloth. Carbon bi-sulphate is also used to a very large extent in what we call curing, or vulcanising tobacco pouches, balloons, and articles of that class; but I have not personal experience of that branch of the trade in any district.

3611. Have you had any cases of workers suffering from poison by naphtha?—No, I cannot say that I have. People have complained of loss of appetite, headache, and so on, from this cause, but such are not absolutely symptomatic.

3612. (Mr. Cunynghame.) How far could it be said that the fumes of this bi-sulphide incapacitate men from work? I am not quite clear upon that point from your evidence?—There is the experience of a man who was 18 months away from work.

3639. That was in the past?—Yes, of course, before the special rules were brought out and observed.

3614. Was that from the effects of one single poisoning on a specific day, or was it the effect of working for some time upon this work?—It was the effect of working for some time.

3615. Then if there is not a fan there is clearly poisoning, as well as merely accidental fumes?—Yes.

3616. Are you familiar with the difference between

the notion of poisoning by accident and of poisoning by slow degrees and constant exposure to fumes?—Yes.

3617. And you would say that here was a case of poisoning which was not an accident?—Yes; these cases I refer to are all poisonings, and not accidents. The only cases that might be put down to accident being the one of nitrous fumes in chemical works, and perhaps some of those occurring in aniline black ageing rooms.

3618. But now, apparently, poisoning seems nearly to be put an end to in the trade?—In this particular process. I cannot say that it has been altogether put an end to in the curing or vulcanising of balloons and tobacco pouches.

3619. And it goes on in those still?—Yes, in some degree; but I have not personal experience of that, and, therefore, I would not like to say much about it. In this I have, and can say with confidence, that the special rules have made a wonderful difference.

3620. (Professor Allbutt.) Then really, within your experience, the disease has become reduced to accident now in these works; that is to say, if accidentally, some day or other, the machines were defective, some poisoning might arise?—Yes, or if the men would not observe the precautions, the symptoms being then of the acute or "intoxicating" variety.

3621. You say that, with the exception of some slight drowsiness in hot or muggy weather, no ill effects have been noticed? When this occurs it would, speaking generally, be quite occasional?—Yes.

3622. So that if this happened several times a year, for instance, and the effects passed off on going into the open air, it would leave no injury?—Exactly. They do not work continuously at the process now as they did formerly; they cannot work at it for more than five hours at a stretch.

3623. As I understand, this drowsiness will only occur occasionally?—Only occasionally.

3624. And there is not any continuous slight degree of poisoning going on of which that drowsiness is the symptom?—Not under present conditions.

3625. (Dr. Legge.) In consequence of its poisonous nature, have the firms been endeavouring to obtain a substitute for carbon bi-sulphide in the waterproofing of cloth?—Yes, there is a great deal more vulcanising by heat of these waterproof cloths than there was when I first commenced to make these periodical examinations.

3626. There is a marked diminution, then, in the cases of carbon bi-sulphide poisoning?—Yes; in fact, my experience is now that the men never work at it for the five hours allowed. Probably they might be a couple of hours at it every other day, or a couple of hours each day. Sometimes they have a push on, and might get up to five hours, but it is very rarely that they are employed five hours at this process.

3627. Are you aware of any fresh industries in which carbon bi-sulphide is being used extensively?—No, not in my experience.

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3628. (Chairman.) You have been kind enough to come to give evidence before this Committee, at the request, I understand, of the Dock Labourers' Union?—Yes, they have requested me to do so.

3629. And you have done medical work for them?—Not officially, but for the men individually.

3630. But you are speaking here to-day on behalf of the Union, so far as medical questions are concerned?—Yes.

3631. You are engaged in practice in the East of London?—In Millwall—that is, the Isle of Dogs.

3632. And you have had experience of the diseases to which dock labourers are specially liable?—For three years past.

3633. What diseases should you say those were?—Affections of the throat and wind-pipe—inflammations, I mean—bronchitis and asthma.

3634. And how do these diseases arise in this particular employment?—The men state that it is from the dust that occurs in the grain which they handle.

3635. And do you think that is so?—It is a most marked fact that before they have been at it a few years they are all chronically affected with these complaints—those who work in the grain, as it is called.

3636. These complaints, I suppose, arise quite gradually after a man has been at work for a period of time?—It is so—gradually.

3637. Do these complaints incapacitate the men for work, and continuing their employment?—After they have once reached the chronic stage, a specially severe day's work will bring on the complaint acutely.

3638. So that they are not able to go on with their work?—On occasion they have to stop. I do not say always, but on occasion. It is quite a regular thing,

after they have had a hard day's work, for certain of the "chronics," as I call them, to come up and say they are worse and they want medicine—after they have had a specially hard day's work on the grain.

3639. But do you ever get any of these cases where the men are laid up and kept away from work by these complaints?—Not often.

3640. But you have come across such cases?—I have.

3641. Have you come across any fatal cases?—I could not say so. There are so many factors to be considered, I mean. These men, nearly all of them, take too much drink, on account of the exhausting work they have to do; and, after a few years, the men are not only unhealthy from the inflammatory trouble brought on by the work, but that is aggravated by the drink. Then the men really become aged at 50. I count all of them at 50 as older than they ought to be at 60; and the result is, they break up by the least exposure and the least overwork. But it is a difficult question to say that it would be due to one specific exposure.

3642. But you consider that these throat and chest complaints may be held distinctly to arise from working in grain cargoes?—They most decidedly do. I do not know one man who has been at the work a few years who is not subject to a chronic inflammatory state.

3643. Do you find precisely the same symptoms prevalent—though, no doubt, less prevalent—amongst persons who are not engaged in that employment?—I think they are more prevalent in this class of work. I do not really know any class of men who have been at work for some length of time who have not gone wrong, more or less, in the way I speak of.

3644. Do you find other people who are not doing the same kind of work showing the same symptoms?—Yes; other employments do bring it on, but not to the same extent as that employment, I think.

3645. I mean, in people who are not engaged in any industrial employment of that kind? For instance, would you ever find the same symptoms in a clerk or shop-assistant?—You might, if he was working in impure air—in air overcharged with grit.

3646. But it would never be due to the ordinary circumstances of people's daily life? You or I, for instance, would never be likely to show those symptoms?—We might get, at times, the same inflammations, but not from the same cause.

3647. But the symptoms themselves would not be necessarily distinguishable?—No, not from an ordinary case. You would only have the history of having worked in the grain to say that it was due to the grain.

3647*. I will put it in this way: If you are visiting a hospital, and you see a man suffering acutely from these symptoms, you cannot say definitely that that man is a dock labourer?—No, you cannot.

3648. You cannot even say that that man has been working in an atmosphere charged with dust?—You cannot, unless you ask.

3649. Have you had any experience of any ill-effects arising from sulphur or other chemicals that may form part of a ship's cargo?—I have not had any experience.

3650. Then the only diseases of which you would speak in evidence before this Committee are throat inflammations, bronchitis, and asthma?—Yes; it is so.

3651. (Mr. Cunynghame.) The different cargoes landed in that dock are apparently grain, timber, and provisions?—Those are the special cargoes.

3652. In addition to that, I suppose there is a great bulk of other material?—Yes; there is a large amount of other material.

3653. Do you find that these throat inflammations are confined to people who are concerned in the grain cargoes?—No; they are not confined to them altogether. You get a fair number of other people who, as in any other form of work, get them.

3654. Timber, for instance, does not throw out any dust particularly?—No.

3655. Why should the unloading of timber be any more dangerous than, say, doing the work of a brick-layer's labourer? Can you show to us that the people engaged in grain unloading have a larger proportion of this disease than people engaged in unloading other things?—Most certainly they have. As I say, hardly one of them escapes by the time he has been a few years at the work.

3656. Take the grain unloading. Do men who do grain unloading stick to that particular trade, or do they go to other work—such as timber one day, say, and grain the next?—The work is mixed up, as a rule. I mean that a man will one day work a ship with grain, and another day, when that is finished, he will work one with wood, or anything else.

3657. Then how are you able to say that it is the grain that causes the evil, if the evil exists, when the man works in five or six different operations? How can you say that the grain causes the evil any more than timber causes it, or something else causes it?—Because timber could not cause these bronchial complaints especially.

3658. But are the bronchial complaints such that they cannot be accounted for by anything but the grain?—The grain brings it on with every man who works in it for a few years.

3659. Do you mean with every man who has worked a very little time in grain, because a man not only works in grain, but he works in timber and other things?—There has to be a certain amount of exposure, I would say, first to bring on these inflammatory complaints.

3660. Exposure to what?—To the grain. It is not the grain itself which causes them; it is the impurities mixed up with the grain.

3661. But how much exposure to grain is needful to bring on these complaints?—I would say five years constantly employed at it.

3662. But there are no men who are constantly employed on grain for five years, are there?—Yes, there are some who stick to it.

3663. Who stick entirely to grain?—Yes; they call themselves by that class of work alone.

3664. What is their title—what do they call themselves—grain labourers?—Grain workers.

3665. Is the disease larger amongst grain workers than amongst the majority of dock labourers?—It is. As I have said, hardly anyone escapes after a few years.

3666. Of those grain men?—Yes.

3667. Do you mean the men who stick to grain entirely?—Yes; hardly anyone escapes after a few years.

3668. What class of men is it who do dock labouring work?—These grain workers can only be men of good physique—they have such heavy weights to handle. I think the ordinary sack weighs 280 lbs. that they handle.

3669. And what class of man is it that does this work? Is it the better class of dock labourer? They are stronger, you have told us. Is it the more respectable class?—Yes, the men round Millwall are Hampshire men, and men from that side and the people who come out of Essex I think, and that part. They are well-built, big men.

3670. They are among the farm labourers, I suppose, of whom London is draining the country?—All the older men are the farm men who crowded in some 25 years ago. I forget when it was that there was that great influx of men; but there was, about 25 years ago, a great influx of farm men.

3671. But at the present time, from what class are these men recruited—the younger men?—The younger men are men that have come up from the country to join them since, and their own sons.

3672. You mean that the grain men are nearly all country-bred men of good physique?—Almost all of them.

3673. Do they earn a higher wage at the grain loading work than the others?—Whenever there is plenty of work they do earn a good wage.

3674. How much, for instance, do they make a week?—It depends upon the ship being in. I have known a good grain man earn 50s.

3675. He will earn anything between that and 30s., I suppose?—I am afraid it has been very much less of recent years. They have brought in machinery to unload ships now, and the result is that a great many of these men, who used to have full work, are considered fortunate if they work about one-third of a week.

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3676. What do they do in the remaining two-thirds of the week?—They simply loaf round, unless they can get employed on the other steamers, and the other steamers have their regular hands, so that it is just a chance that they get work upon them.

3677. Then there ought to be, according to that, a considerable diminution in this disease really, if the number of men employed in grain work is diminishing?—In one sense, yes; but it has to be remembered that it is only in the last three or four years that they have begun to use machinery to any extent, and these men were "chronics" before.

3678. But if this disease were put in a schedule, might it not lead to the wholesale deprivation of work of a large number of men?—I think so.

3679. You mean that they would all be thrust out of work?—I think there would be at once many ships that would be discharged by machinery.

3680. And that the whole of these men would be thrown out of work?—Most of them.

3681. (Chairman.) But are there not many cases—the great majority of cases—in which the men are incapacitated from work for less than a week? How many cases of these complaints would you say you have knowledge of in which the men were out of work for more than seven days?—Very few, because it would be very hard to prove that it was a specific instance where the disease was due to this specific exposure to dust.

3682. But you think in some cases it might be possible to prove it?—In some cases it might, but it would be very hard. If I might just say this, all these men are chronic invalids from it, but I do not see, personally, how they can be put under the compensation provision—it would be very hard indeed to do it.

3683. (Mr. Cunynghame.) But my point is rather that if they are chronic invalids, and their life so much shortened, it is a serious thing, and not a slight one, apparently?—It is, most decidedly.

3684. Then, if it is a serious thing, they would be incapacitated for more than a week, would they not?—I am not arguing the case of the men alone.

3685. No, it is a difficult point to get at. If it is a serious disease, we must contemplate their being laid up for more than a week or so, must we not?—Yes.

3686. Then, of course, they would certainly come under the Workmen's Compensation Act?—I might say that I can only recall in the three years two cases which would have gone under the Act if you have to prove that the specific exposure has resulted in their being ill.

3687. But you may assume that that is not so; that would be a kind of accident, as it were. The case under the new Act would be that the constant exposure, extending over some years, had produced a chronic state of bad health and disease?—Which bad health only becomes acute on exposure, and only then for a few days at the most, so far as I can see.

3688. But do you mean that a man who has got bronchitis, and whose complaint has shortened his life considerably, would not get compensation, and would not be able to claim it for more than seven days or so?—I do not mean to say that a man, after he has worked at it for eight or nine years, has chronic bronchitis every hour that he lives; but he has got a condition which makes him easily susceptible to chronic bronchitis, and that is brought on by special exposure. It is not brought on by every ship that he unloads; it is by special exposure on occasion, if he is not up to the mark, say, or if the cargo is specially filthy.

3689. Then, supposing he gets into this state, and some fine day he goes away home with a real chronic bronchitis, would he not then be a proper subject for compensation under the Act if this disease were included?—He would, if it were included. Personally, I do not see how it would be fair.

3690. (Chairman.) I understand that you are of opinion that there are not any cases in which a man is permanently incapacitated, in the sense that he cannot work any day in the week, or any week in the year?—Only when he breaks up, and it brings on old age

before it ought to come. These men at 50 are as old as they ought to be at 60.

3691. But it could not be said that such a man was incapacitated by some bronchial affection. I understand your point to be that the man is made by his trade specially liable to bronchial attacks?—Yes.

3692. He may be working in a dusty cargo, and get bronchitis; he may stay away from his work for a day or two, and when he is recovered again he goes back to work?—Yes.

3693. And he goes back to work for three or four months, and has another little attack, and has to stay away again. And that, perhaps, goes on for several years?—Yes.

3694. Then at last, having suffered from these occasional attacks of bronchitis, he finds, with advancing years, that he is unable to go on working any more?—As a fact, all these years his heart has been undergoing a fatty change, as a rule; and then he gives up ultimately not from bronchitis so much as from his heart simply giving out.

3695. But is the heart affection due to the bronchial attacks?—I am afraid it is more due to the alcohol.

3696. So that really the bronchial attacks are one thing giving rise merely to temporary short periods of incapacity?—Yes.

3697. And the general physical deterioration of the man's physique is a separate thing, which makes him old before his time, and prevents his working at all?—And every attack of bronchitis hastens that.

3698. But it is not the sole and direct cause of it?—That is so.

3699. Or even the main cause of it. It is not the main, direct cause of it?—I have not lived there long enough to say that. I am watching certain men who are total abstainers, or practically so, and they all of them are not men in good health. That is all I can say.

3700. (Mr. Cunynghame.) Were the men in good health when they started work some years ago?—They would not have been allowed to start if they could not do a proper day's work. When a man has to carry weights of the amount I have mentioned, he must be in good health.

3701. And they are not able to carry them now?—Yes, they can carry them; but these men who are total abstainers do not look well.

3702. Is that due possibly to the climate of the place in which they are living? Is it unhealthy round there?—I think it is very healthy; personally, I have found it very healthy. A man constantly inhaling dust and grit of any kind for a few hours, even say 24 hours a week, cannot be up to the standard of health that he ought to be.

3703. I should like to ask you a question upon that. Take a miller—take the proverbial jolly miller. He is supposed to breathe dust all the days of his life. Would you put him down as an unhealthy man?—I think he is subject, certainly, if he takes alcohol—

3704. No; leave the alcohol out, and suppose him to be a temperance man?—He gets phthisis on occasions, of a special form.

3705. Then apparently you would not put these dock labourers on a worse footing as regards disease than millers?—No.

3706. And all people exposed to dust?—I would put them fairly well together.

3707. What would you say of the servants who clean out the House of Commons after the members have left there, and who live in an atmosphere of dust—sweeping? You see the reason I put that question—for the purpose of comparison?—They are not there to the same extent. If you have ever been on a ship and seen the stuff in the hold, you will know that a man cannot live in the hold for more than a quarter of an hour; he has to come up to breathe again.

3708. It is very bad in the hold?—It is very bad; and if you go past a ship when they are unloading, all round the side of the ship, and all over the ship, you see this white stuff lying about that is mixed up with the grain—the dust.

3709. Have you ever made any analysis of the dust from the grain?—I have not; but I have been told that it is chiefly sulphate of copper.

3710. It has been put into the grain to preserve it?—It is mixed with it to prevent its undergoing mildew.

3711. Would you attribute any of this complaint to copper poisoning?—No; they spit it up again. The usual routine is that a man goes down into the hold, and after he has been working there for an hour or so, up he comes. He says he is clogged. He has a good drink of ale, and brings up the stuff, or he starts to cough and brings up the stuff, and then goes down, into the place again. They inhale a certain amount into their lungs, and often a large amount sticks round the throat.

3712. Which they bring up instead of swallowing?—Yes.

3713. Is there any silica in the dust in the grain?—Not that I know of.

3714. I understand that, speaking from the best knowledge that you have of the Workmen's Compensation Act, and of its meaning, you are not of opinion that these complaints ought to be included, you do not advocate their being included, in the Schedule of Industrial Diseases?—If the complaint shortens a man's life, it is a proper thing to include; and this unquestionably shortens his life, and makes him old and unfit for work before he should be. That is the first point.

3715. Then you leave it for us to say whether that is in the Act or not?—Exactly.

3716. That is a prudent and proper answer. But, at all events, the evil of which you are speaking is confined to cargoes of grain?—Yes.

3717. Does that mean wheat?—Chiefly wheat.

3718. And any other cereals?—It would be any other, because these impurities are added to keep the cargo dry.

3719. Would it be so with oats, for instance?—I expect the same thing occurs there. I have seen the same stuff round the ship's side with oats.

3720. Apart from the grain, there does not seem to be any industrial disease connected with the docks?—Yes; there are others.

3721. Timber only results in accident?—Yes.

3722. It is a healthy trade otherwise?—Yes.

3723. Then, if we take the provisions, I suppose the provisions that come from such a town, for instance, as Chicago, occasionally give rise to filthy smells in the hold?—We do not have that at all. The provisions that we get nearly all come from Copenhagen.

3724. What does the filthy brine in the hold do?—I simply added that for this reason: I can only conceive of its causing trouble by a man going down and becoming sick, and so bringing on spitting of blood or anything else. I have had one case of that. That is what I work upon.

3725. But, after all, for that matter people may be sick over all sorts of things—they may be sick over a sea voyage, and break a blood-vessel?—Yes.

3726. That idea would be too remote altogether, would it not?—I have had just one case, and in the present spirit of the age, if the Act had been in force, it would have been fought.

3727. But you would hardly, would you, call a filthy smell which caused somebody to go down and be sick and break a blood vessel, an industrial disease?—No, I would not.

3728. So that we come back to this, then: that the only disease you can mention, among those that we have really to consider, is that arising from the inhalation of grain dust?—It is so.

3729. (*Dr. Legge.*) I am anxious to know whether there is any local lesion which accompanies the effects produced on the lungs that you speak of. Before the impurities in the grain pass down into the throat and lungs they have to pass through the nose?—Yes.

3730. Is there any local effect produced by copper sulphate, or by the dust that you notice on the margin of the nose?—No, none.

3731. Or inside the nose?—Inside the nose there is just the ordinary simple running from the nose—weeping on occasion, but nothing to mention.

3732. There is no ulceration?—There is no ulceration.

Mr. R. J. FRISWELL examined.

3733. (*Chairman.*) You, I believe, are a chemist by profession?—I am.

3734. Are you an analytical chemist?—I am an analytical and research chemist. I am a Past Vice-President of the Institute of Chemistry, and a Past Member of the Council of the Chemical Society, and chairman of the London section of the Society of Chemical Industry. I have had nearly 30 years' experience in the manufacture of anilin and anilin dyes.

3735. As an employer of labour?—No, as a chemist, and as a director and manager of works.

3736. You are able to tell us something of the industrial diseases which arise in dye and chemical works?—Yes.

3737. Would you mention first those diseases which you consider most serious?—I cannot call them diseases, but the most serious attacks or lesions are those due to the action of amino compounds, as they are termed, such as anilin, toluenes, xylenes, etc.

3738. Are those all covered by the term amino compounds of benzene?—Yes, and its homilgues.

3739. What classes of workers are subject to these poisonings?—The men engaged in the production of the amido compound from the nitro compounds—that is, nitro-benzene, nitro-toluene, or rather toluenes—there are several—and the nitro-xylenes.

3740. Then all workers engaged upon the production or use of these compounds are liable to poisonings therefrom?—They are liable to poisonings therefrom.

3741. Are they sudden poisonings, or do they arise gradually in the course of a period of time, during which the man is employed?—They are sudden, and they are always the result of accident. In a well-regu-

lated works such cases arise only from breakdowns, which are absolutely unavoidable on occasion.

3742. What about a badly-regulated works?—If there were such a case—I do not know that there is such—it would be almost impossible for the men to work; the effects are so severe. Men working with these substances are in the position of men working with poisons, and what might be termed deadly poisons.

3743. Anilin would come under that category?—Yes.

3744. Are there other chemicals which are not so dangerous, but which, nevertheless, may give rise to disagreeable symptoms? What compounds should you say would be in that category?—The nitro products themselves are said to cause bad symptoms, but personally I cannot say that that is the case. I have myself entered into vats the floors and walls of which have been saturated with nitro-benzene, for instance, and I have suffered no ill effects. The first effect is a stimulating and somewhat exhilarating effect, something like entering into this room if a large quantity of alcohol had been spilt upon the floor; you feel a warmth and exhilaration in the lungs, chest, and so on, and you get what might be termed slight alcoholic excitement. If you then go away into the open air no ill effects whatever follow. Personally I have experienced this on many occasions, and have never suffered any ill effects from it; and I have never known a case of a workman suffering any ill effects therefrom. On the other hand, I must tell you that the explosives people who use bi-nitro-benzol and bi-nitro-toluol, and bodies of that kind, are extremely afraid of the presence of any traces of the mono-nitro compounds in them; but then, in that case, the workers are engaged, I believe, in handling these things and putting them into cartridges, and in that case they possibly have these nitro compounds, if they are present,

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constantly under their noses and near their faces, and so they may get a far larger dose than in such cases as I have been mentioning. I have no experience myself of an explosive factory, but I have been informed that that is the objection to bi-nitro compounds not free from mono-nitro compounds, which is felt in the case of explosive works—that is to say, the presence of mono-nitro compounds is considered dangerous by those who make explosives from bi-nitro compounds.

3745. Going back to anilin for a moment, do you not ever come across cases of men who contract the poisoning gradually?—No, none whatever. The effects of anilin are very peculiar. A man may get pretty severely poisoned by it, and yet be unaware for a time of the effect of that poisoning upon him, unless his comrades notice it. The first effects are great pallor; then blueness of the lips, and, finally, of the tongue. Therefore it was my custom, whenever aniline had been spilt, or when it was necessary that men should come into contact with anilin vapour, that the fellow-workers should continually look at each other and see whether they noticed any sign of blueness of the lips or pallor, and if they noticed it then that man was immediately moved into the open air.

3746. You do not come across cases of men being prevented from working by this poisoning?—No, it passes off quickly as a rule. I might say the effects are these: You first get this pallor and blueness of the lips and tongue, then you begin to feel headache about the base of the skull and a slight dizziness and general malaise. If the thing continues after that, the urine becomes extremely dark—coffee-coloured, and then, if the case is not relieved, the man may completely collapse. But, of course, in properly regulated works such a case is never allowed to get so far. As soon as the slightest blueness is seen the man is sent out into the open air and kept there, and directed to take exercise, and, if necessary, a man is put on to walk about with him and see that he does take exercise.

3747. (Mr. Cunynghame.) Then it seems to be your opinion that in a badly regulated factory it would be quite possible for a man to contract a gradual disease through the occupation of working on anilin?—That I cannot say at all, because I have never known a case of a man subjected chronically to its action. So far as I know, these effects are very severe, and, if they are not relieved, would be deadly; but I have never seen them go far enough to produce any really permanently bad effect.

3748. But how long does it take for the urine to become coffee-coloured?—I should say possibly not more than two hours from the time of the first attack.

3749. Supposing that a man, instead of being exposed on one occasion to too much of the vapour (to a great deal too much, say), was exposed from day to day to rather too much of it, not enough to make him blue, but still enough to have an effect upon him—would you say then that he could contract the disease in that way in a badly regulated factory?—I cannot say at all. I have never come across such a case.

3750. But if other people have said that it was possible, you would not be in a position to contradict them?—No. I should say that the general effect would be that a man perpetually subjected to small doses of aniline would suffer a general deterioration of physique.

3751. (Dr. Legge.) The xylenes you speak of are much rarer chemical compounds, are they not, than the others?—Yes.

3752. Can you say what they are used for?—They are used in manufacturing colours, scarlets particularly—what are known as azo-scarlets.

3753. Are they manufactured where di-nitro-benzol is manufactured?—I do not think there is a single factory now in England making xylenes. So far as I am aware, the only things which are now made in England are anilin and the toluenes—ortho and para toluenes.

3754. Have you any knowledge of the effects of paranitraniline?—I have manufactured it myself. I have never seen any ill-effects arise from it.

3755. Are nitrous fumes given off in the process of dyeing paranitraniline reds?—When this substance is used for making colour, nitrate of soda is also used, and if proper care is not taken, there may be considerable escapes of nitrous gases.

3756. It is not essential for the production of the chemical?—No; it is absolutely unessential. In fact, it would be bad manufacturing. You would get a bad product if you had nitrous fumes given off.

3757. There is one other chemical, chlor-nitro-benzene. Do you know that?—Only in the laboratory. I have not used it on a manufacturing scale at all.

3758. You would regard that as poisonous?—It would undoubtedly be poisonous if taken internally, or if it was rubbed on the skin, on large surfaces of the skin, or if the dust of it were inhaled.

THIRTEENTH DAY.

Friday, 21st December 1906.

MEMBERS PRESENT :

Mr. HERBERT SAMUEL, M.P. (Chairman).
Professor CLIFFORD ALBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.
Mr. T. E. BETTANY (Acting Secretary).

Mr. HARRY ORBELL, called in and Examined.

Mr. H. Orbell. 3759. (Chairman.) I think you are an official of the Dockers' Union, are you not?—That is so.

21 Dec. 1906. 3760. Have you had experience of work at the London Docks for a number of years?—Yes.

3761. First as a workman?—Yes, for over a period of 25 years, the first ten years as a workman and the last 15 years as an official of the Union, with, of course, special duties relating to docks.

3762. The men who work in some of the grain cargoes suffer from various complaints, I believe?—Yes. Perhaps it would be well for me to give you my personal experience on the matter, as I have done a good deal of work myself. The first effect you realise is a smarting and an itching about the eyes and the

nostrils, particularly with grain cargoes from the Black Sea, arising I suppose from the sulphur or blue stone as it is known amongst us, because it happens to be blue. Then there is a choking sensation in the throat, an excessive dryness which causes coughing and so on. The next development is a sensation of being stifled, which arises I suppose from the dust; and then comes a difficulty of breathing. Whilst I have never been taken out of a ship's hold myself by bleeding of the nose, which is another symptom, there have been many in the different gangs I have been in who had to be carried out because their noses have begun to bleed. Their ears also bleed. That may be brought about by the strain in coughing. But I have also seen some bleeding at the nose who have not really shown any

sign of straining. I do not know any other cause for it than the stuff which is mixed with the cargoes and the dust. Many of the cargoes are very hot and very dry, and some of them smell most objectionably, especially if the ship happens to be a sweating ship, or the grain has been put in damp. Either of those things would cause rather objectionable smells. I do not know of a man in my own experience that has reached the age of 45, supposing he started work at 30, at the grain business, that is capable of doing an ordinary day's work, and certainly he dare not go down a ship's hold. He is generally done up with asthma. I do not know one of a gang who could take his corner in bushelling, slinging, or bagging at that age owing to being weak at the chest. Since I dropped that work I have been employed looking after the men at the docks as an official, and I think one can safely say, without fear of contradiction, that it would be a very hard matter indeed to find three in every ten men who had been at the grain work for say three years and upwards that could breathe freely, or dare go into any kind of grain cargo. They would have to pick their cargoes.

3763. Are men prevented from doing any work at all by complaints that arise from working in grain cargoes? For instance, were you yourself ever away for a week through having contracted some complaint through working in a grain cargo?—Yes, I was away nine days in 1888 with my eyes and throat bad. I thought I should be afflicted the whole of my life with my eyes. They became very much inflamed, which I had never suffered before going into grain cargoes. I had to bathe them with different lotions. Once I got the lotion from a London hospital, and another time I got it from an ordinary doctor, but each time there was a likeness between the lotions I had to bathe my eyes with, and I had to gargle my throat.

3764. Do you attribute that to working in grain cargoes?—Yes, I know of nothing else to which to attribute it.

3765. Have you come across other men working in those cargoes who were similarly affected from similar causes, or is it only a matter of a few men?—Many men are taken out of the ships' holds because they are absolutely exhausted. Those would be men who had followed up the work for a year or so, and having been idle for a time and not in a position to refuse a job, they have gone down into it may be an exceptional cargo, or an ordinary Black Sea or Baltic cargo, and they very soon got exhausted. Then it is a question of being out of the ship's hold for a few hours. They may be taken off in the middle of a day and be capable of going back next morning, but I know of several who dare not go down a ship's hold at all now to bushel grain—it would be a matter of facing death with them. It would be an easy matter to get at the Victoria Docks or along the south side of the Albert Docks, or in the Millwall or Surrey Commercial Docks many of these cases; it would not be a question of getting one here and there. The singular thing would be if you found one man not affected by working among the grain.

3766. Those points are of great importance in connection with preventing these complaints, and introducing better methods of handling cargoes, but we are concerned here with the Workmen's Compensation Act, of course, and the real question we have to discuss is what diseases should be scheduled as subjects for compensation, and there can only be compensation under the Workmen's Compensation Act if a man is incapacitated owing to disease for a period of one week or more. In connection with Dock work, if a man is prevented by a feeling of discomfort from going among grain cargoes, and feels ill and does not work at the grain cargo at all, it would not be a subject of compensation, nor would it be a subject of compensation if he were incapacitated for an hour or two or for one or two days. Do you find men made actually ill, as you yourself were made ill, through working in these particular kinds of cargo, and thereby incapacitated from working for a week or more?—Yes. I referred to that class of men when I mentioned those you would find at the Dock gates.

3767. But they are not prevented from working, are they; they can work at some other employment, cannot they?—No, unless they get a very, very light job indeed, which is not offered to a man of this kind. For instance, a man who had difficulty in breathing or was eaten up with asthma might be able to sweep a room, where there would not be dust but ordinary

litter. That is work reserved for very old men who are considered beyond work. You would find men at 45 who would be of no use for any other work than that. Mr. H. Orbell.
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3768. Do the men work at one time for one company and at another time for another company? Dock labour is casual labour to a great extent. If a man owing to asthma were obliged to give up his ordinary work at the age of 45, who do you suggest should pay him compensation?—If he is in the habit of working in grain he would have his regular gang, and therefore would be more or less working under one particular firm, and I should suggest that his employer that was should compensate him. If it was the Grain Elevator Company they would be the employers.

3769. But a man might be developing asthma for a period of 20 years. Would you go back and include all the persons he had worked for during that time?—I am afraid that would be a question for the law to decide or someone else. I could not decide on that.

3770. (Professor Allbutt.) What you have said does not apply to all cargoes, does it? Do you confine yourself to wheat?—I am speaking of grain cargoes. Some are worse than others.

3771. Does the extraneous dust or dirt or smell only apply to cargoes from the Black Sea?—No; they would be the worst. I have never worked in a cargo that has not more or less been choking with dust or blue stone or lime.

3772. Would you say in a large proportion of these cases there is dust enough to set up these symptoms sooner or later?—Yes, I should say so.

3773. Do you go so far as to say that it would be found in all of them, even Canadian cargoes and clean wheat?—I have worked among the Canadian cargoes, but it would be an exception to find a Canadian cargo as bad as the Black Sea and Baltic cargoes. Black Sea and Baltic cargoes are generally bad, but a Canadian cargo would have to be a very bad cargo to be equal to a Black Sea ordinary cargo. But even Canadian wheat has dust in it, and affects anybody working in it.

3774. Do you know how the dust gets there?—No, I only know that it is there.

3775. What do you think is the average duration of a grain porter's working life? Does he begin to work young?—It is a job to find a man who has followed up the work working to-day at 45.

3776. But what time does he begin?—That I could not say. I only know that I fortunately was able to pick my cargoes.

3777. At what age would a man be strong enough to be accepted as a grain porter? Do they begin at 20 or 30?—You might find some amongst them who would be 25 years of age, a capable man, and it may be possible to trace that man at 45 when he would be better than an average man at 45, but I cannot give you a general idea as to the age they would start at as a grain porter. It is a question of working up into the gang. A man may work at the docks for a considerable time, and then get into a grain gang. The grain gangs are not looked upon as ordinary casual workers. A man knows his employer, and knows when the ship comes in he is right for a job on that ship.

3778. Then there is some regularity of employment, is there, among the grain porters?—Yes.

3779. In a sense it is a skilled employment, is it; it is not everybody who can do it, I suppose?—No.

3780. Therefore a man cannot drift out of something else and become a grain porter?—No.

3781. Therefore they must begin, I suppose, at some definite age and be brought up to it?—A man generally gets on first at weighing, and then probably over the hatch, and finally he gets worked into the gang, and gets down into the hold bushelling, holding up the sack, and then taking turns with the trimming.

3782. Is it possible to say whether beginning early or late in life would make much difference as to the result?—I do not think it would.

3783. It is a very laborious employment, I suppose?—It is.

3784. Is it one of the most laborious of labour employments?—I should say it would class among one of the most laborious.

3785. Does it consist in carrying wheat in sacks?—Yes, that would be the backing. It depends on the nature of the cargo and the nature of your order.

Mr. H. Orbell. 3786. Would a man carry as much as eight bushels of wheat on his back at a time?—Yes. A sack of wheat generally runs to about 2 cwt.

3787. Whether it affects the heart or not I suppose you do not know, or shall we have to ask medical men about that?—I think so. I cannot tell you about that. I should like to say that the notice I received was so short that I had to depend to a large extent on my own personal experience for information. I should have liked really to have brought you statistics to have proved the case right up to the hilt. It would have been quite an easy matter if I had had more time to have got an average of the duration of labour, and how long they are capable of keeping up to a standard pitch of work, and also I could have got doctors and so on. Such details I admit I have not been able to get, not because they are not get-at-able, but simply because the time has been too short. I could get them, if necessary, afterwards.

3788. Do you think that the muscular labour is any considerable element in the injury done, or do you think it is entirely due to dust and asthma?—I do not think that the carrying of the bags and the running up of the planks will cause asthma.

3789. But do you think it makes the men short of breath?—That part of the business never made me short of breath. I could do a week or ten days or a month backing, running the plank, which is the hardest part of the work, better than I could do three days of bushelling—I should be a better man afterwards.

3790. (*Dr. Legge.*) Do you complain more of the dryness of the throat, inflammation of the eyes, and the bleeding of the nose, than of the chest symptoms?—Those are the first effects—the eyes and nose and throat, and there is a kind of sulphur taste in the mouth.

3791. Which you attribute to the dust and blue stone, do you?—Yes.

3792. Could you get a sample of that blue stone?—Yes, I have a sample at home, and I meant to bring it, but I forgot it. I will send it.

3793. Have you in the Dock, Wharf, Riverside, and General Workers' Union classes of men who do not work in dusty occupations like grain—for instance, orange porters or people transferring coal?—We have orange porters in our Union.

3794. Are they a very small number?—The orange porters, or what we call the fruit porters, number about 300.

3795. The Committee would like to compare the average duration of life of the men who are exposed to the dust in the grain of cargoes with that of the orange porters, who would not be exposed to dust?—Just so. Judging from the general appearance of the men, and my knowledge of those men, they work to a much greater age than the average corn porter.

3796. Do you get medical certificates in the case of all the men who have to leave work?—No, we have no sick pay attached to our Union, therefore these men do not really come under compensation in any way, or receive any benefit from the Union so far as sickness is concerned. I do not know, unless they belong to a friendly society that has sick pay attached to it, where they demand a doctor's certificate, how that could be got.

3797. Then the statistics you refer to would have no bearing on the complaints from which they suffer, would they?—I should go round, knowing these corn gangs and having known them for a great number of years, to those I worked with and ask them when they started, and what time they were compelled to knock off owing to the effects of the grain. That would answer the questions when they started work and when they were compelled to knock off. It would be quite an easy matter to get the number following up the work, and you would get to know from them the number of years they had been doing it.

3798. But that would not give what they were actually suffering from?—Of course not; but they say themselves, and you would only want to glance at them to see that they were suffering from the effects of the work.

3799. It has been stated in evidence that, owing to the arduous nature of certain work and the dryness produced, that the men take alcohol in large quantities. What do you say as to that?—Unfortunately it is the case generally, but not in every case. For instance,

that could not be applied to me, for I am practically a life abstainer, yet it had the same effect on me. But there was that fortunate part of the business that if I had been working in a dusty cargo for a fortnight or three weeks I would take particular care I would not show up to such a job again, but would endeavour to get something else, although it was less money, and try by baths and taking proper care to get myself right. But then, you see, everybody could not do that; all of them do not do that. What I drank was simply oatmeal and water with tartaric acid.

3801. (*Chairman.*) With regard to the men who work in cargoes of hides, do you find any of them are prevented from working for a period of a week or more through their employment?—Yes. That is quite common on the P. and O. boats, or I might say all boats that trade between England and Calcutta and Bombay. There are two kinds of hides. There is the green hide and the dry hide. In the dry hide there is an insect, the same as you find in the green hide. I do not know the name of it, but they can be picked from them. As soon as this fly or insect bites them the men have to go to the doctors to have the piece of flesh taken out entirely, which in some cases means a long illness, because until it is healed a man cannot follow up his work at all.

3802. Does the bite cause a pimple of any kind?—I have seen two or three men who were bitten, and one when he was bitten simply felt an itching sensation, then a slight red spot that got inflamed showed itself, and it was suggested he should go to the doctor; away he went, and the next we knew of him was coming back in a fortnight or three weeks' time with the place healed up, and he was capable of working again. That was the first introduction I had to that kind of insect.

3803. Have you heard of any fatal cases from that?—Yes. There was a man who lived in Burnside Street, Grove Road. He was working on the south side of the Albert Dock. He was bitten somewhere in the arm, and he went home and had a poultice put on it, thinking it was simply an ordinary poison, and within a couple of days he was dead. The thing is so much known round the docks now that as soon as ever a man gets a bite away he goes, and it is only a question of a few weeks' illness.

3804. Do you know whether that has been certified by the doctors to be anthrax?—Yes, that is the name of it.

3805. That is already scheduled in the Workmen's Compensation Act?—Then the next thing is bleeding at the nose and ears, caused by vomiting while at work on these green hides. The stench is dreadful. I have had to knock off work in consequence of it.

3806. But you would not be laid up and incapable of doing work for a week, would you?—Yes. I do not know of a man who is capable of doing two days' work continuously on those hides. Those who are compelled to follow up that kind of business are taken off the green hides to-day, put to another job to-morrow, and then back again on the green hides. As soon as the ship gets fairly well on the way, so that they can discharge some of the men, that man is paid off with the rest, because he is too ill to work, but you would have a job to prove that he was laid up because of that particular employment; yet it occurs each time.

3807. (*Dr. Legge.*) Are the green hides dry?—No, they would be wet. They come over bundled up. They are not just as they were taken off the beasts' backs, but they have that appearance.

3808. Then the symptoms would not be due to dust, would they?—No. When handling green hides, if a man has the slightest scratch on him it generally sets up blood poisoning. With the dry hides, if you get ever such a slight scratch from them, unless your blood is in very good condition, you may depend upon it you will get blood poisoning.

3809. (*Professor Allbutt.*) Does not that go back to anthrax?—It is in both. It is more common in some hides than others. For instance, the hides which come from Calcutta are very dangerous indeed. A man could not very well prick his skin with the dry hides, but he might scratch it without noticing it. I have handled them hundreds of times and I know they are very sharp indeed, some of them. For instance, at the corners they come to a point. If you prick yourself with it, unless your blood is in very good condition it means that you are in for an illness to a certainty.

3810. (*Chairman.*) With regard to men who are working in cargoes of ore, what complaint do they suffer from?—I will deal with that if you like, but another witness, I think, will deal with it better than I can.

3811. You state that in some of the northern ports the men are exposed to other dangers. Have you any specific cases to bring before the notice of the Committee?—Yes, and I think it would save a lot of your time if I hand you a statement which contains facts all within my own knowledge. I know every one of the cases personally, and I know every case mentioned there except the cases of death.

3812. One case you mention I see is that of a man suffering from erysipelas, which is stated to be due to his employment?—Yes.

3813. What was his employment?—He was a night-soil man under the Corporation. It is necessary work, but objectionable work.

3814. In what town?—Middlesbrough; and I find on inquiry that the same thing applies to almost all the northern towns. The same thing applies to the whole of the Hartlepoons, Stockton and Sunderland, and on the north-east coast it applies to Hull, Grimsby, and Goole. Then in Wales it applies to the outer parts of Swansea, and as far as I can understand, though I only quote those cases as cases in point, the same dangers apply elsewhere. The men employed in this work are a body of men who are rarely taken notice of; they are doing very necessary work, and are

exposed to great dangers, which are likely to spread, and do spread in the shape of such fevers as typhoid. *Mr. H. Orbell.*

3815. Are they members of your Union?—The men in Middlesboro' and Swansea happen to be in our Union; in the other towns the men would belong either to the municipal unions or to no union at all.

3816. Do they suffer from any other disease besides erysipelas?—Yes, poisoned blood, typhoid fever. You have in the list a case of death, I think, from typhoid. You have a case also recorded there where a man conveyed typhoid fever home to his children who were in the sick bedroom. I could get similar proof from other towns if I had time to do so.

3817. (*Professor Allbutt.*) Well, any of us are liable to have typhoid fever, are we not, from accidental infection?—Yes.

3818. You would have to show, would you not, that there was a very large, an excessive, amount of disease amongst these men?—Yes. We are all liable to catch typhoid fever; still, there are some classes of business which expose you more to the danger of having it.

3819. You must bring forward, I think, not individual cases, but some statistics showing excessive prevalence, something beyond the ordinary incidence?—Yes; but you have a case there of one man suffering, another man conveying it to his family, another one dying, another catching erysipelas, and the doctor's statement I think shows that it is something out of the ordinary. That is all with a small body of men. I suppose in that particular town there would not be 200 men, if there were that number, employed in the work.

Mr. JAMES WIGNALL, called and examined.

3820. (*Chairman.*) Are you an official of the Dockers' Union?—Yes.

3821. Have you had experience of men working in cargoes of ore?—Yes.

3822. Do they suffer from any disease or complaint from their employment, in your opinion?—Yes. I have tried to classify them as well as I could, and I should prefer, if you would allow me, to commence with the discharging and working of pitch, which is used in the manufacture of patent fuel, and which is one of the items of dock work. I have tabulated a statement showing the various illnesses the men suffer from, which I will hand in.

3823. Are these men incapacitated from following their employment or any employment?—They are incapacitated from following their employment. Some of them you see marked as incapacitated for various periods extending from a week to six months. Every case has come under my personal observation; they are well known to me, and I give the names of the doctors who have attended them.

3824. Can you present to the Committee any medical evidence on behalf of your Union with reference to pitch poisoning? Is there any doctor in Swansea or any of the neighbouring parts who could give evidence on this particular matter?—You will notice that I mention that several operations have been performed by Dr. Brook, one of the most eminent surgeons in the town. Then I give the name of Dr. E. B. Evans, who has had a large experience in dealing with this disease. Then Dr. Joseph Davies and Dr. Newell have had considerable experience in dealing with these cases. Then there is Dr. Rhys Davies, who is treating cases at the present moment. All those men have treated these cases, and could give you evidence if you desire it. I have had no conversation or communication with the doctors. The fuel trade is a trade peculiar to South Wales. I think there is not much of it done except at Swansea, Port Talbot, and Newport.

3825. What are the first symptoms of pitch poisoning?—It affects the men by causing what we know as pitch warts, and it affects the eyes. The pitch is imported in railway trucks or in small sailing craft; the men are employed in getting it out, and transporting it to the works, where it is ground up in the factory. The men working in the pitch directly are most seriously affected, but the other men employed at fuel works are also affected, but perhaps to a lesser extent.

3826. After the warts, what are the next symptoms?—They come out on various parts of the body, and develop into cancer and other very serious complications, which a medical man could explain better than I can. In other cases it affects the eyes, which become very red and blistered, and frequently there is partial, and in some cases total, blindness. One man named Mills lost his eyesight about 14 years ago.

3827. Do you attribute that to working in pitch?—Absolutely; nothing else. And it is painful to see some of the men now working in the pitch-bins, who are more or less partially blinded—not able to work in any other employment, but simply waiting till the end.

3828. Do I understand you to say these men work in docks?—Yes; the discharging of pitch and the loading of fuel is dock labour. Then the factory is adjacent to the dock, and the men inside the factory work in the factory, but they are not covered by compensation, because there is no compensation for illness. That is what we are hoping to get. I have tried to distinguish the actual effect on health, apart from accidents. No cases I mention in that paper have ever received compensation to the best of my knowledge.

3829. Do the men who work in the factory suffer from these complaints?—The men dealing with the pitch suffer very acutely, and the men in the other departments suffer, but not so acutely, as the men at the pitch-bins. You cannot see a man sometimes for the dust from the pitch in the grinding process. Certain men have to attend to the grinding machine, and then there are other men who take the pitch away.

3830. What is done with the pitch after it is ground?—Then it is run through a machine to mix with the coal to make patent fuel blocks. The pitch comes from one direction, the small coal from another direction; they meet together, they are mixed up with steam, and then pressed into square bricks. Then it is thrown up in the shape of hot bricks, which are taken away and shipped. The men employed in the work are all more or less seriously affected. A man named — has gone through three operations, and has had his testicles removed, and his case is a most pitiable one.

3831. What was his case? Was it a case of cancer?—I would not like to say, not knowing from the doctor, but he has had one of his testicles taken out. He is a living testimony to the dangerous character of the work. Another man is troubled in a private part of the body, and has had a part of it removed. The same

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thing will apply to Cardiff, Port Talbot, and Newport. I have mentioned in the list two or three very bad cases from those places.

3832. Do you think these cases occur among men working in the pitch over a series of years, or do they occur among men who have only just started to work?—No. It is a peculiarity of the whole thing. There are men who go through showing the symptoms, but not very seriously, and there are other men who are almost immediately affected either in their eyes or in the body, and have to seek employment elsewhere. Some hang on to it, and are incapacitated for various periods, and then are totally incapacitated from work. These men somehow or other have got into the groove, and simply stick on till they are finished.

3833. What are these diseases called in the trade?—Among the men they are called pitch-warts; pitch poisoning I suppose would be the proper term for it.

3834. (*Professor Allbutt.*) The pitch poisoning would have a general effect on the constitution, would it not?—Yes, it affects them in various ways. I know of a case where a man was picked up dead. He was working in the pitch-bin, and I heard that his body was literally plugged up with pitch. I knew the man personally, and he looked almost like a piece of pitch. His face had gone the colour of the pitch, so had his hands, and all the men are so affected in their appearance, some worse than others. This man had not been brought up to the pitch business; he had gone to work there in middle age. I should not think he had worked at it many years, and it seemed to affect him. I have not had time to collect all the evidence I should like to put before the Committee. I could have got a list six times as large as I have. I have only given you the cases which I knew of absolutely.

3835. (*Chairman.*) With regard to men who are engaged in discharging cargoes of ores, what complaints or diseases do you consider they suffer from owing to their employment?—In South Wales there is a large amount of minerals imported, and amongst them there is a sulphide ore which affects men badly and brings on paralysis. We do not get so much of it as we have had in Swansea when there was a factory established for dealing with it, but during the period of three or four years, when we had large importations of this ore, all the men were more or less affected, and I remember in the case of one particular cargo, which I mention in my statement, the men absolutely refused to work it, as they were so affected in health, and an outside gang was brought in. In the Bristol Channel we always work in gangs, and a man in a particular branch of employment follows that employment.

3836. Do the men suffer from lead poisoning?—I should call it lead poisoning, but I am not a medical man. It being a kind of lead ore, I should take it a doctor would certify it to be lead poisoning.

3837. Then they are included in the schedule, you see?—If you include the discharge and the handling of ores as well as the process of the manufacture in the schedule that is right, and that is what I strongly recommend.

3838. You have had a number of cases of lead poisoning amongst the men, have you?—Yes. They are starting a new factory in Port Talbot, and the trade is coming back, and we shall have a large number of cases. The man Walker I have named died from paralysis afterwards, and several others I know of who never suffered before commencing work on this lead ore. At the present time there is very little of it, but we are expecting a large quantity of it, and if you include the handling of the ore in the process of manufacture that would meet it. Then there is an arsenic ore, of which we have large quantities, which affects men by blistering the body and burning the eyes, and we have difficulty in getting the men to work on it at all.

3839. Are they incapacitated for a period of a week or more?—Yes; I have known them to be incapacitated for two, three, four, or five weeks.

3840. By arsenical poisoning?—Yes, by arsenical poisoning. I take it that that would be a trade that would be scheduled, and if the discharge of the ore is included that would meet the case.

3841. Copper precipitate is another ore, is it?—Yes, copper precipitate. That is used largely in the manufacture of copper, and that affects the men much

in the same way, only it does not blister the body so badly, it affects them internally more, bringing on asthma and chest troubles of all kinds.

3842. Is there any doctor in Swansea or the neighbourhood who could give evidence on that subject?—I should think that Dr. E. B. Evans could give you evidence on practically the whole thing. He is a man who has an enormous practice, and I should think also Dr. McManus Soden, who is the medical man for a large number of clubs, and the docks, could give you information.

3843. Then there is the discharging of calamine for the manufacture of spelter. What is spelter?—Spelter is a metal which is manufactured and largely used for the making of yellow metal and various other kinds of metal. It is a mixture which goes with copper for the manufacture of yellow metal. Spelter is also used in a liquid state for the coating of steel sheets in the manufacture of galvanised corrugated sheets. This trade is peculiar to Swansea, I may say. I do not know whether Swansea is noted for all the unhealthy occupations, but we are glad to have them there, and it is a very busy centre.

3844. Is not that lead poisoning also?—I should say so. A doctor would tell you, but I should say the symptoms are those of lead poisoning. This calamine is very dusty, and it blinds and chokes the men. If you were over the hatchway of a ship discharging calamine you would be inclined to run away as quickly as you could. The men wear sponges over their mouths and glasses over their eyes, but they cannot work in it long, and are frequently incapacitated. I know men who after working one cargo of calamine cannot do anything for a month. They have to get cleansed, and go to the doctors for medicine to clean it out of them. Our men are apportioned in sections, and a man is a weekly servant at our docks. He draws his weekly pay, and the same man will follow the same employment from the time he starts till his death. The same men are always employed in the various departments. The men who discharge the calamine would discharge all kinds of ores. I should like to draw your attention to another ore which you have not mentioned, spathic calcined ore, which is used in the manufacture of steel, and so far as I can see it must be a new discovery on the part of someone or other, because when the raw iron ore was coming in there was no difficulty, and there is no difficulty now. There is a large quantity of ore coming still, but this spathic ore is a burnt ore, and in the process of calcining it there is evidently a large quantity of lime used. They put it into the ships hot, and I have seen it with the fire in it when being discharged. That causes an enormous amount of dust and immense suffering to the men. I have given two cases which occurred at Newport this year, where the men were bleeding and had to be brought out of the hold. One man I knew bled for three days at intervals after he had worked some few days on this stuff. In fact, the men in September gave notice that they would not work any more of this ore at any price, or whatever the consequence might be, because it was so injurious to health. The imports of ore are becoming greater, and evidently there is a huge profit made by using it, or it is better for the process of the manufacture of steels. Every year the imports get greater, and what will be the ultimate outcome of it I do not know; but I can assure you the men resent very strongly having to work it at all. In my opinion, next to pitch, this spathic ore is the most dangerous thing that men have ever been called upon to deal with. It is brutal and cruel, and terrible to see the men in the holds of these steamboats. If the Committee could go on board and see them that would be the best evidence of all.

3845. (*Chairman.*) Are the men incapacitated from working at any other employment for a week or more?—Yes, for a week or a month.

3846. (*Dr. Legge.*) Do you say this is at Newport?—At Newport, Cardiff, and Swansea, but I think the worst place of the lot is Newport. Cardiff is next, and is very bad. I could have got a batch of names and addresses of the men, but I did not attempt to get them as I did not want to give any evidence except what I knew of my own personal knowledge. I have given a list of names of men in one of the friendly societies which the secretary gave me, all of whom were treated by Dr. Evans, and they are employed at only one spelter works out of four. If I had had

time I could have got a similar list from each of the works, of men suffering in the same way. I think there is another important matter to mention. In some ports men are employed to clean out infected ships—ships that are declared to have had fever cases on board—typhoid or other fevers—troopships and others, especially at Southampton. These men are sent on board, and perhaps have to work there 36 hours. They have to be certified by the sanitary authority before they can go back to the world again. A man may be found to be contaminated, and may be sent to a hospital or sanatorium, and may be idle four and six weeks with no chance of compensation. These men are exposed to all the dangers of cleaning an infected ship, and then they have to remain until they are declared by the sanitary authorities to be clean. If a man is found to have contracted fever through cleaning out a bad ship he is sent to the hospital or sanatorium,

and may be there two or three months, and get no compensation at all.

3847. Have you had actual cases of the kind occurring?—I can get them for you. A case occurred last summer at Southampton, and the men complained bitterly to me about it; but they are not safeguarded in any way. The men must not leave the ship till it is finished, and then they have to be examined by the sanitary inspector.

3848. (*Professor Allbutt.*) If you could prove any cases in which the disease was an imported disease, imported as plague is, for example, it would strengthen your case very much. Can you do so?—I will do my best, but you see my point. It may be that if a man is sent to the sanatorium, and he is there two or three months, he may be forgotten, but his family has to suffer because of a disease he has contracted during his employment.

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Mr. HOWELL LEWIS, called and examined.

3849. (*Chairman.*) Are you an officer of the Dock Labourers' Union?—I am.

3850. Do you also belong to the Swansea District?—Yes.

3851. Have you heard Mr. Wignall's evidence?—Yes.

3852. Is there anything you wish to add to it?—I am representing a particular trade—that is, the tinplate trade.

3853. Do the tinplate workers belong to the Dock, Wharf, Riverside and General Workers' Union?—Yes.

3854. Are the men engaged in that employment subject to special diseases arising from the industry?—They are, and I have proof of it. I have had experience myself extending over 25 years. When I started in the tinplate trade, palm oil or grease was used when coating the iron with tin, but since 1889 flux has been introduced. It is composed of sulphuric acid and spelter, and is placed on molten tin, which is heated to 500 F., and the fumes arising from it affect the men so much that the result is asthma. Professor Attfield, on May 16th, 1891, came down from London and analysed the flux at a certain tinplate works and he proved that it, or the fumes arising from it, were injurious to the health of the men working there. In addition to that, the bran used when the palm-oil process was in existence was pure bran, but since flux has been introduced it has been found easier to clean the plates with a bran composed of pink meal (which is a deadly poison) mixed with soot and lime, which is so light that it flies about, and everyone working in the department suffers by inhaling it.

3855. In what way do they suffer?—They suffer from shortness of breath and trouble with the respiratory organs, such as the nostrils, mouth, throat, and lungs.

3856. Are the ailments resulting from the flux and the mixture you mentioned the same?—Yes.

3857. Are they ailments of the respiratory organs?—Yes.

3858. Do you consider that the ailments from which these workers suffer are different, or are similar to the ailments prevailing amongst the rest of the population, if the latter do you think that they are more liable to asthma than other people are?—I believe the inhaling of the fumes of the flux affects healthy strong men in course of time. I myself worked for 15 years with palm oil and never suffered any effects at all, but after I had had seven years with flux I had to give it up. I was at home sometimes for a week to six weeks at a time, and I know of men now who are obliged to stay home from six to eight weeks, especially during the winter months.

3859. When you were laid up on these occasions were you suffering from some form of asthma?—Yes.

3860. Have you suffered from it since you gave up the work?—Yes. I get an attack of it now and again, because I do not think I have got rid of the poison I inhaled.

3861. Is there any medical man in the district from which you come who could give expert evidence to the Committee on the point?—Yes, Dr. J. Bernard Gabe and Dr. Jones, both of Morriston, could.

3862. (*Professor Allbutt.*) You have spoken of two causes of irritation, one from fumes?—Yes.

3863. Is that from the flux when it is melted?—Yes. Mr. H. Lewis.

3864. Is it a kind of smoke?—Yes. Plates or sheets are taken from a trough full of water which has particles of sulphuric acid in it and are passed through the flux into the molten metal to receive their coating, and while these sheets are being so treated the fumes arise and affect the men because they have to stand over the bath of molten tin and must inhale the fumes.

3865. Then, independent of that, is there a dry dust which affects them?—Yes.

3866. Are the effects of the fumes and the dust, as far as you are able to compare them, the same?—I believe one helps the other. The dust, of course, clogs the nostrils.

3867. Is the same person exposed to both the fumes and the dust?—Yes.

3868. So that you cannot say how much of the mischief may be due to the fumes and how much to the dust?—No.

3869. Do you think the symptoms are very much the same as those described by Mr. Wignall from the inhalation of other dust?—Yes.

3870. (*Dr. Legge.*) How many years is it since you gave up working in tinplate works?—Going on for six years.

3871. How long is it since palm oil was universally given up in the industry?—It was somewhere about 1888.

3872. That is nearly 20 years ago?—Yes.

3873. And since that time has practically nothing but chloride of zinc been used?—That is all. It is a quicker process of coating tinplate, and cheaper in my opinion.

3874. When was the inquiry you referred to made by Professor Attfield?—In 1891.

3875. Have you seen his report?—Yes, I have it here.

3876. Do you know whether it was made at the request of the Home Office or not?—I do not know.

3877. Do you know if it was made at the request of your own Union?—I do not know whether it was or not.

3878. Do you know to what he actually attributes the injurious effects to which you have referred; that he does not attribute them to the chloride of zinc, but to the hydrochloric acid fumes?—Yes.

3879. That is not the same thing as zinc chloride fumes, is it?—He says: "In my opinion, the workmen who coat sheets of iron with tin in the production of tin plates do run risk of injury to health by the inhalation of air containing fumes of hydrochloric acid."

3880. With regard to injury to health from the use of pink meal, is it becoming universal in the tinplate trade to use mechanical branning machines?—Yes.

3881. Do you go inside tinplate works yourself now and see the conditions which exist there?—Yes, now and again.

3882. Is there any dust given off from those machines?—Yes, more than there was when girls used to clean the sheets, because the machines tumble the sheets from one trough to the other, which creates dust.

Mr. H. Lewis. 3883. But it is done exceedingly slowly, is it not?—Yes, it is, but every sheet has to be tumbled from one trough to the other, and it is in that tumbling that the dust is created.

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3884. Where the plates are brushed by hand they are allowed to flop down, are they not?—Yes.

3885. People are not compelled to work beside the machines, are they? It is a mechanical process altogether, is it not?—Yes, but the machines are quite close to the tinning pot, and naturally the draught of the stack draws the light dust up and it comes into contact with the tinman.

3886. But there is no person actually leaning over the branning or cleaning machine where the pink meal is used, is there?—No.

3887. Do you know what pink meal is, examined under a microscope or chemically?—No; but I have heard doctors say that pink meal is poisonous to inhale.

3888. By poisonous, do you mean injurious to the lungs?—Yes; it is so light that practically after you inhale it you can spit it up.

3889. Do you say that every person who comes into contact with pink meal or the fumes suffer from the effects of them?—They do.

3890. What other effects besides asthma have you noticed?—It affects the skin where the skin is exposed.

3891. What is the cause of that?—The fumes chiefly.

3892. In what way does it affect the skin?—It creates an irritation first of all, and then the skin goes in red blotches.

3893. Have you seen such cases yourself?—I have, and have had it myself.

3894. How do you know for certain that it is due to the fumes or to the pink meal; how do you know it is not due to the weather?—The fumes have more effect, undoubtedly, in the winter months than in the summer months, but the dust and the pink meal do not have more effect in the winter than in the summer.

3895. Have you any sick club in connection with your branch of the Union?—No, but I am certain you cannot find a man tinning to-day at the age of 45, whereas under the old process with the palm oil you could find men of 50, and even 60 and 65 years of age, at work at the tinning process. Scores of men to-day are trying to get their living outside.

3896. Can you give any proportion of the men among the tanners who are ill? It is merely guess work on your part, is it not?—I have the names of six or seven men here, and I could give you scores of others. I have a case of a man named — who I believe does not work more than three months in the year.

3897. What does he suffer from?—He is suffering from asthma, caused entirely, by the doctor's evidence, from his work. Then I have another case, —, who has been ill for eight months, but has just commenced work again. He has been suffering very severely from the same complaint. Then —, a tinman, has been home ill for the past 15 weeks; and —, a young man, not more than 25 years of age, has to keep his bed.

3898. What for?—From the effects of these fumes.

3899. Is he medically attended by a doctor?—Yes. Then there is another man named —, who has been suffering for a period of eight or nine months.

3900-1. Are the cases you have mentioned cases taken at random, or do you know of many others?—I know of a good many more, but I have seen these personally.

3902. But there are thousands of people employed in the tin-plating trade, are there not, and if the cases you have mentioned are the only cases they do not represent a large proportion, do they? Are there 500 men, do you think, employed as tinmen in your district?—Yes, more.

3903. But the number of cases you have given do not suggest, do they, any great amount of illness amongst them?—But I am only giving you evidence as to practically two works in one district.

3904. Do you know anything about the conditions in the other districts?—Yes.

3905. Do you know the men employed there also?—Yes.

3906. And you have not put down on your list every case?—No.

3907. Morriston is the largest centre of the industry, is it not?—Llanelly is the largest, I think; they may be as large as each other.

3908. How many tinmen are there in Morriston? Have you included in your list those who suffer not only from the fumes, but from the dust?—Yes.

3909. Do you know of any women who have been incapacitated owing to their work?—No, but there are a good many of the women who become ill.

3910. From the complaints you have mentioned?—Yes; the girls generally wear handkerchiefs over their nostrils to prevent inhaling the dust.

3911. If they are not leaning over the branning machine at all, is it necessary for them to wear anything?—Yes, because the dust flies about, and if you could see the girls and the tinmen two hours after they have entered the room you would find them covered with dust—they are all white. Where they use soot, of course, it is mixed. The proof that it is impossible to prevent the inhalation of the dust lies in the fact that within two hours the workpeople get covered with it, and that in the best-ventilated tin houses in the trade.

3912. Is it your opinion that some of the people employed in this industry might not be so much affected by the dust as others?—Some are able to stand it better than others.

3913. (*Chairman.*) Is it your opinion that asthma is much more prevalent amongst the people who work in these places than it is amongst other people in the district?—Yes, undoubtedly.

3914. But you have no statistics to prove that, have you?—I have given you cases.

3915. But illustrations do not prove it. I suppose one could go to Swansea and find a lot of people not employed in this industry suffering from asthma?—Yes.

3916. Have you any comparative statistics on the subject?—No, I have not.

3917. Do you think such statistics could be obtained?—Yes, if you asked the medical men.

Mr. C. S. BREBNER, M.D., called and examined.

Mr. C. S. Brebner, M.D. 3918. (*Chairman.*) Are you Medical Officer of Health for Widnes?—Yes.

3919. How long have you held that appointment?—I have held the appointment for 15 months, but before that I was Deputy Medical Officer for a short time, so that I have been there a little over two years now.

3920. Have you knowledge of the conditions of work in which the men are engaged in the chemical industry?—Yes.

3921. Do you consider that any particular disease is specially prevalent amongst them?—No, I cannot say that I do; taking them as a whole it is very difficult to find any disease that you could put down to the conditions of their work.

3922. They are not, in your opinion, then, apart from accidents, subject to any particular form of poisoning?—There are the possibilities of lead poisoning and

arsenical poisoning, which are provided for already, but apart from those things there is really very little disease of the respiratory organs which may be caused. Men may get bronchitis, and so on, but it would be very difficult afterwards to say whether it was caused by the trade or not.

3923. What would you say with regard to poisoning from nitrous fumes—have you come across any cases of that kind?—No, I never have. With regard to nitrous fumes in the works, I am told that they do not allow much of the nitrous fumes to escape, because it does not do—it is such a valuable thing that they keep it as much as they can. I have never come across any case of poisoning by those fumes.

3924. Or from hydrochloric acid fumes?—No. There is a lot of bleaching powder, and so on, made there, but I do not think the men get poisoned, or at any rate for

any length of time. A man might get what they call in the works "gassed"—that is, it might get into his lungs—but it does not last, and he is not incapacitated from work a long time.

3925. Have you known any cases from ammonia chloride fumes?—No.

3926. Or sulphur fumes?—No. All those things come under the same head. Any man might say he had been "gassed," but you could not put it down to any particular thing.

3927. Do you find that chemical workers to any extent are prevented from following their employment by ailments arising from their industry?—I do not.

3928. Have you anything to say with regard to affections of the teeth?—It is generally supposed that there are affections of the teeth caused, but I do not think there is very much in that.

3929. (*Dr. Legge.*) Are you in private practice as well?—Yes.

3930. In your private practice do you come across chemical workers much?—Yes, some of them.

3931. You mentioned cases of gassing from chlorine; have you in your experience come across any case or cases in which you believe chronic effects have been produced by chlorine gas?—No, I have not.

3932. So the gassing is really in the nature of an accident, is it?—As far as my experience goes I have never found anything chronic about it, and it has been, as you may say, an accident; the effects have passed off soon, and the man has been able to go back to work again.

3933. In your opinion, therefore, poisoning from chlorine gas is not of such a nature as to be included in the Third Schedule to the Workmen's Compensation Act?—I have not seen any cases which would lead me to dissent from that opinion.

3934. Have you heard of any cases from other medical

men?—No, I have not; and I have had conversations since I have been summoned here with medical practitioners in the town who have been there 20 years, but I could not get any information from them as to any chronic cases occurring there.

3935. Can you say about how many men there are employed in making bleaching powder in your district?—In the chemical works altogether there are between 4,000 and 5,000 employed, but I could not give you the figure for the bleaching powder works alone.

3936. Does the manufacture of bleaching powder form a considerable part of the trade at Widnes?—Yes.

3937-41. Is there anything in the statistics of the district which points to anything special with regard to respiratory diseases as compared with the general population of the kingdom?—No, I have gone over the annual reports for various years since the Borough was incorporated in 1892, and found that up to last year, when I made my first report, the statistics had been arranged in rather a peculiar way. The deaths were returned at all ages from five and upwards, so that it is very difficult to classify which were working men and which were not, but the deaths from bronchitis and respiratory diseases generally do not form a very great number of the total deaths.

3942. Have you compared them with the deaths from those causes among the general population of Great Britain?—No, it would be impossible to do that, because we have them ranging from five years old and upwards, so that it is very difficult to get a comparison.

3943-4. Could you compare the death rate among the adult male population, say, between 25 and 45, in Widnes with that amongst the adult males between those ages throughout the country?—I am afraid I could not for years back; I could only do it from 1904, which would be hardly of any value. In 1905 of the deaths of persons in Widnes between 25 and 65, which numbered 156 from respiratory diseases, 23 were due to bronchitis.

Mr. J. A. EATOCK, M.R.C.S., L.R.C.P., called and examined.

3945. (*Chairman.*) Are you a medical man in practice in Widnes?—Yes.

3946. Are you certifying surgeon there under the Factory Acts?—Yes.

3947. Have you been there for many years?—About 10 years.

3948. Have you a knowledge of the complaints from which chemical workers suffer in that town?—Yes.

3949. Are you of opinion that there are any diseases specific to that employment?—I think to a certain extent the respiratory troubles can be credited to the character of the employment.

3950. Do you consider that the men employed in the work are more than ordinarily liable to asthma?—Yes, to bronchitis and asthma.

3951. And phthisis also?—Repeated attacks of bronchitis would lead to phthisis, I think.

3952. Have you any statistics showing the comparative mortality from these complaints among chemical workers and other persons?—No.

3953. Why do you consider that they are specially liable to these complaints of the respiratory organs?—Because I go through chemical works very frequently, and I find there are always irritating gases about which have a tendency to irritate the pulmonary organs.

3954. Is there also dust about?—Yes, in the working of bleaching powder there is dust, and also in the grinding of minerals.

3955. What gases are particularly noxious?—I should think in the burning of pyrites; in the manufacture of sulphuric acid sulphur di-oxide is made, which is irritating. In making bleaching powder they have to use chlorine, which is an irritating gas. Sulphuretted hydrogen is irritating to a certain extent. All those gases are used in the manufacture of the different products.

3956. There is, I presume, no difference between asthma and other respiratory complaints from which these men suffer and similar complaints among the rest of the population?—No, I do not think one could differentiate between them.

3957. You could not say if an individual were suffering, say, from bronchitis, that it was bronchitis in any special form or bronchitis which would be due to this industry?—No.

3958. Is it your opinion that these ordinary complaints are more prevalent amongst this class of workers?—Yes.

3959. Are there any complaints connected with the teeth from which they suffer?—We find that the men have very bad teeth, which, I think, is partly due to their occupation and to the cloth they use to protect their hands when working with a long rake. Occasionally when they anticipate some gases coming out they put the rag in their mouths, which I think does affect their teeth.

3960. But the men are not incapacitated from working, are they?—No.

3961. And consequently, it could not be a subject for the Workmen's Compensation Act, could it?—No.

3962. Are there occasionally injuries caused to the skin?—Yes, in the packing of bleaching powder a man ordinarily protects his skin with fat, and he gets a little irritation, but it does not incapacitate him.

3963. Do you ever have any cases of men being prevented from working by troubles of the skin?—No, they are of a temporary character, and in the same way with "gassing." If a man is badly "gassed" he is usually killed, but if he is not badly "gassed" it is a matter of a few hours only.

3964. It is, of course, an accident if he is killed, is it not?—Yes.

3965. (*Professor Allbutt.*) Your evidence is not founded, is it, on any definite statistics?—No.

3966. Are your impressions strong impressions?—Yes, because I go through the works regularly in Widnes and Garston.

3967. Under what conditions, speaking generally, are these workers engaged; for example, a person who is employed indoors, or even out of doors, might so far be under favourable conditions as regards health, but a person engaged in works of this kind, pervaded by

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draughts and changes of temperature, would be more liable to disease, would he not?—Yes, I think so.

3968. Well are there any such conditions as these, do you think, to be considered?—Yes, but the works on the whole are very well ventilated, though the men have sometimes very hot furnaces to attend to.

3969. You think the atmospheric conditions under which they work are prejudicial?—The atmospheric conditions, barring the presence of gases, are, I think, very good.

3970. Do they have to pass from hot to cold places?—Yes, they have to do that at times, but the worst I can say about the chemical trade is that it is a very unpleasant and laborious trade; otherwise, barring what you might term accidents and trouble with dust and occasionally getting lead poisoning, my impression is that it is a healthy trade.

3971. Do you think these diseases fall rather under the head of pneumonia or bronchitis?—Yes, but you could not say that that bronchitis was due to the employment, because you could not distinguish it from bronchitis due to a chill caught by a man engaged in any ordinary trade.

Mr. J. J. BUCHAN, M.D., called and examined.

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3979. (Chairman.) Are you Medical Officer of Health for the Borough of St. Helens?—I am.

3980. Are you in private practice there also?—No, I am not.

3981. Have you been there for some years?—I have been there for two and a half years.

3982. Are there a large number of men engaged in the chemical industry in that town?—Yes, we have constantly over a thousand, but it is rather difficult to estimate them. At the last census the number was 1,100.

3983. Do you consider that those workers suffer from any specific trade diseases?—I consider the occupation is a healthy one. I am acquainted with the processes carried on in the manufacture of chemicals, and I am of opinion that an average healthy workman may be employed without injury to his health at any of the works.

3984. Have you some statistics which you can put in showing the comparative mortality, and so forth, amongst workers engaged in this industry and workers engaged in other industries in the same town?—Yes. I examined the causes of death among the workers in St. Helens from the year 1901 to the present time, practically six years. Of those deaths there were 121 among alkali workers, and 1,175 among workers in three other branches of industry in the same social position as alkali workers, glass workers, general labourers, and miners. The other industries of St. Helens are glass-making and coal-mining, so that I practically included all the working men of St. Helens in my examination into the causes of death. I found the average age of death of the chemical workers was 54 years; the average age of death of the general labourers was 49 years, and the average age of death of glass workers and miners was 49 years. It happened to work out that in each of the latter three cases it was 49 years. Now 54 years is a very good average indeed for the age at death of working men, so that the figures do not indicate at all that it is a specially dangerous trade. The diseases from which these chemical workers died were as follows:—From diseases of the heart and blood vessels, 15, and the average age at death was 52 years; from diseases of the lungs the number of deaths was 49, and the average age at death was 57 years; from diseases of the kidneys the number of deaths was four, and the average age at death was 50 years; from diseases of the nervous system the number of deaths was 10, and the average age at death was 52 years; from alimentary diseases the number of deaths was two, and the average age at death was 50 years; from diseases of the skin there was one death only, the age being 63 years; from infectious diseases the number of deaths was four, and the average age at death was 47½ years; from phthisis and tubercular diseases the number of deaths was 10, and the average age at death was 40 years; from cancer and malignant disease the number of deaths was four, and the average age at death was

3972. (Dr. Legge.) Do you find that these chemical workers at the age, say, of 45, suffer from chronic bronchitis and asthma?—No, I cannot say that I do.

3973. So that the effect of the inhalation of these gases is not cumulative in the sense that taking silicious dust into the lungs is cumulative in gradually producing fibrosis?—No, I cannot say that I find it so, except that, of course, when a man is "gassed" he is troubled occasionally with bronchitis, but then he gets all right again.

3974. Are there many chemical workers at work over 45 years of age?—Yes, I should say so, judging from going through the works.

3975. Do you know of any chronic effect produced by the inhalation of chlorine gas?—No.

3976. Or of sulphuretted hydrogen?—No.

3977. Or of sulphurous acid gas?—No, I know of no chronic effects.

3978. Do you find that the employment of young persons is followed by any temporary ill effects lasting for more than a week?—No; the young persons are not employed about the worst part of the works, where they burn the ore and so on.

57½ years; from violence—that is to say, from accidents at works—the number of deaths was two, and the average age at death was 36½ years; from accidents not at works the number of deaths was five, and the average age at death was 49½ years; from old age the number of deaths was eight, and the average age at death was 67 years; from other causes the number of deaths was six, and the average age at death was 58 years.

3985. Is it your general conclusion that it is not an unhealthy trade, and that there are no specific trade diseases connected with it?—My general opinion is that it is far from an unhealthy trade—indeed, I should think it is the most healthy trade we have in St. Helens.

3986. Leaving averages and coming to individual cases, do you ever find men employed in the chemical industry who are suffering from complaints or diseases which you would be inclined to attribute to their work?—Yes, you do find such men, but you cannot go any further than the fact that you are inclined to attribute their diseases to the work. You find cases of chronic bronchitis amongst chemical workers as you do amongst the general population, and the fact that these men have been intermittently exposed to some irritant fumes makes you incline to attribute their illness to that cause, but in my opinion you cannot go any further than the inclination to attribute it to that cause.

3987. If a man came to you and you did not know what trade he was employed in and you diagnosed the symptoms he showed, would you be able to say that the man was evidently suffering from a complaint which he must have acquired as a chemical worker?—No, you could not possibly say that; you could not possibly diagnose his work.

3988. Might he have been a tramcar driver for all you could tell from his symptoms?—Yes, he might have been anything. Pneumonia and bronchitis are so exceedingly common to all classes and there is nothing peculiar about it amongst chemical workers.

3989. Have you come across any cases of men who have been exposed to sulphuretted hydrogen gas having suffered thereby?—Yes, but they are extremely rare now. Sulphuretted hydrogen gas is generated in the sulphur recovery process. I understand they did not know so much about it some time ago as they do now, and there is now practically no escape of sulphuretted hydrogen gas. In former times men were "gassed" through working with sulphuretted hydrogen gas, but they are not now.

3990. When you say they were "gassed," do you attribute that gassing to some defect in the apparatus they were using and the consequent sudden fuming of the gas?—Yes, some escape of sulphuretted hydrogen from the apparatus.

3991. And that would be in the nature of an accident and not in the nature of a disease?—That is so.

3992. In the manufacture of sulphuric acid is there any complaint or disease arising apart from accident?—In the manufacture of sulphuric acid the only part of the process which can be considered dangerous to health is the tending of the furnaces where the iron pyrites is burned. The man at those furnaces is putting in pyrites and is liable to occasional whiffs of the SO_2 gas, but it is very occasional. I have seen those workers frequently and spoken to them, and I find it is very rare indeed that there is any back draught.

3993. When it does occur, what are the effects on the man?—It would act as an irritant and cause him to cough.

3994. Would it incapacitate him from working?—No; he is not nearly so liable as a sanitary inspector in the pursuit of his ordinary duties, to suffer from the effects of SO_2 gas.

3995. Do you find any chronic bronchitis amongst these men?—I have noticed no exceptional incidence amongst them; I have questioned them particularly as to the condition of their lungs, and I find that many of them have been for years at the work without suffering from any respiratory disease. In the manufacture of salt cake there is a liability to exposure to hydrochloric acid gas. Before the passing of the Alkali Works Regulation Act, there was, I believe, considerable danger, but at present all works have to condense 95 per cent. of the hydrochloric acid.

3996. Would the fumes arising from that gas cause sudden poisoning or gradual poisoning?—They would cause sudden illness from which the patient would recover. I have never found, and I have never seen, any evidence to show that there is chronic poisoning from these gases, and they do not set up fibrosis of the lungs. Then in the manufacture of bleaching powders great advances have been made. Under the old process a man had to go into a chamber and put on a muzzle and things of that sort, because he was particularly exposed to the effects of chlorine gas.

3997. If a man fell down in the course of his work and had to be taken out, that would be accident and not disease, would it not?—Quite so.

3998. And you do not, I understand, find any disease arising from the occupation?—No. At present bleaching powder operations are carried on entirely under cover, and the workers are not exposed to chlorine gas. In the manufacture of chlorate of potash, I do not know of any diseases arising. Chlorate of potash is sometimes ground, and in the grinding there is liability to dust, and that dust might possibly give rise to fibrosis of the lungs, but there is no evidence at St. Helens, and I have carefully inquired into the matter, that such has been the case. In some of the processes of the manufacture of bleaching powder, you sometimes get a dusty atmosphere which might possibly set up fibrosis of the lungs, but there is no evidence to prove it. In the manufacture of copper and copper sulphate there is no evidence that it gives rise to any disease among the workers. With regard to arsenious acid I cannot say much, as we have only one man at St. Helens working at it; it was only started about four months ago.

3999. Are there any specific diseases common to workers in alkali works?—I am taking alkali works and chemical works to be the same.

4000. Are there not chemical works in St. Helens which are not alkali works?—I do not know that there are.

4001. Are they all alkali works?—Alkali works is the common name for them all in St. Helens.

4002. (*Professor Albutt.*) Can you give the Committee, to illustrate your averages, the extreme cases?—Yes, I will furnish particulars of actual cases, with names and everything.

4003. (*Dr. Legge.*) Are there any other effects produced from potassium chlorate than those you have mentioned?—Yes, you may find chronic anæmia.

4004. Have you any evidence of that?—No; I inquired particularly amongst the workers, but could not find it.

4005. If there was chronic anæmia would it be recognisable as anæmia due to the occupation?—Yes, you would get medical evidence in such cases proving that it was due to the occupation.

4006. Can you say how many men are engaged in the manufacture of potassium chlorate?—I cannot say. It is only in the grinding that a dust is created which exposes the worker to the effects of potassium chlorate. There would not be more than half a dozen men employed at grinding.

4007. Is potassium chlorate made anywhere else than in St. Helens?—I could not say.

4008. With regard to the lime dust which is given off in certain processes, has it occurred to you that it is subject to a certain kind of slaking process after inhalation?—It is slightly slaked before being wrought in order to keep it as little dusty as possible.

4009. That would create a chemical change giving rise to heat, would it not?—Yes.

4010. Has it occurred to you that injury to the lungs might be caused in that way?—It has occurred to me that the process might cause injury to the lungs. The workers who supply the lime to this apparatus wear muzzles over the mouth in order to prevent particles of lime getting into the lungs; it has been found impossible to get a man to wear a muzzle over his mouth and nose as well, and the worker inspires by his mouth and expires by the nose.

4011. Have you any evidence to show that the inhalation of the lime itself is injurious?—No; men have been working in it for several years, but find no inconvenience whatever.

4012. Has your notice been called to any cases of cataract among the glass workers?—No, it has not. That, of course, is a different question, and I have not prepared any evidence on the subject.

4013. If cataract among glass workers was a prevalent disease, you would have heard of it, I suppose?—Yes, but it is not a prevalent disease so far as my knowledge goes, because in the eye department of the hospital cataract is not at all frequent.

4014. Do you know the interiors of the glass factories?—I know the interiors of some of them.

4015. Is bottle-making a large local industry?—Yes.

4016. What is the name of the principal firm of bottle makers in your town?—There are two—Nuttall and Co., and Cannington, Shaw and Co. The glass firm is Pilkington Bros.

4017. Have they any medical man specially in charge of their sick club or their employees?—Yes.

4018. Do you know who he is?—Dr. Siddall is in charge of the big works, and devotes his time wholly to the glass workers. Dr. Jackson is also connected with one of the other works.

4019. (*Chairman.*) Will you ascertain whether there has been any disease prevalent among bottle makers in your district, and let the Committee know?—Yes, I will look into it.

MR. JOHN LANGTON, F.R.C.S., called and examined.

4020. (*Chairman.*) Have you had experience for a number of years in connection with the City of London Truss Society in regard to cases of hernia?—Yes, for 43 years.

4021. Can you tell the Committee whether hernia amongst working men is a disease usually caused by accident—that is to say, by some sudden definite cause, or whether it is caused gradually by the employment in which they are engaged?—That is a very difficult question to answer. Of course, one sees all sorts of cases at all stages of life, and under all conditions. I have prepared some statistics which I

thought perhaps might be useful showing the times at which hernia occurs in the different quinquennial periods of life. Are you assuming that hernia is caused by accident?

4022. No; I am asking you whether, as a rule, the cases of hernia you have had under your notice amongst working men could be said to be due to accident or have been gradually caused by the particular employment. For instance, would the injury happen at a particular moment, or would it be caused at a given moment?—No. I have made inquiries, by my colleague, the late Mr. Kingdon, and myself in about 2,000

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cases, and I find that out of the whole number only 82 ascribed their hernia to accident.

4023. To what cause or causes can it be chiefly ascribed?—It is partly inherited—partly owing to illness, but mostly ascribed to coughing in the first instance.

4024. Would it be caused by a muscular strain?—Not if the intestines and the abdominal viscera and walls are normal.

4025. If they are not normal might it be caused by muscular strain?—Yes, I think it might, but it would take many weeks, and probably months, to cause a hernia which would be recognised by the patient.

4026. I have a case in my mind before a court of law in which a man claimed compensation for an accident because he had ruptured himself in turning the handle of a machine which had got stuck—do you think that such a case as that is frequent?—No, I think that was the way in which he found it out. The hernia already existed at the time he thought he was ruptured, and had probably existed months without his knowledge.

4027. If that particular machine had not stuck in the way it did, or if the man had not been working at it, might he have gone on for a long period without feeling any discomfort?—Yes, but he would probably have abdominal trouble which he would refer to the hernia.

4028. For years, perhaps?—Yes. I hold strongly that it is not the outcome of hard work, and that 95 out of every 100 cases exist before the patients find it out, and that some cough or strain or blow brings the hernia down a little further, and then they for the first time become aware of its existence; then they ascribe to accident or other injury as the cause of the rupture.

4029. Is it easy to determine the origin of most cases?—I think it is. The intestines are supported by a suspensory ligament which under many conditions of ill-health becomes elongated; that allows the intestines to fall and come within the grip of certain muscles which will cause further extension. In health all the abdominal muscles help to support the intestines, the liver and the other solid organs; but directly these muscles fail a little the abdominal viscera come within the action of the same muscles, but in a downward or reverse direction.

4030. Is the elongation of the ligament ever caused by the conditions of employment?—I do not think so, for the normal action of these muscles is to support the viscera.

4031. Is it a defect in the internal apparatus which might be found in anybody?—Yes, and when this defect is dependent upon an arrest of development in the child the hernia is called "congenital."

4032. If a railway porter is ruptured, and ascribes the cause of the rupture to lifting some heavy luggage on a particular day, as a matter of fact might it have developed just the same if he had had a cough?—Yes; I have no doubt about that.

4033. Is it a popular error to suppose that rupture is merely caused by muscular strain?—The term rupture is a misnomer throughout; there is no rupture; there is no breakage of any sort; the protrusion is due to a gradual downward inclination of the intestines into a sac.

4034. In your opinion, therefore, is it to be considered in any sense as an injury arising from an industrial occupation?—No; I think that peers and members of the House of Commons are just as liable to it as workmen are, only that owing to their easier mode of life the necessity for wearing mechanical support is not so obligatory.

4035. If a man is ruptured, can he continue his work if he is provided with a proper truss?—He can, in the large majority of cases, if he wears a truss.

4036. Do you think men may be prevented from following their employment by rupture?—I do if it is not properly treated. If they do not wear a truss or are not operated upon for a radical cure they are not so competent to do work, but nevertheless hundreds and thousands go about their work daily in London not knowing that they are ruptured and yet do a fair day's work.

4037. If they do know they are ruptured and are properly treated or operated upon, can they continue their employment in all cases?—They are not incapaci-

tated from work if they wear a truss, except of course if the rupture is so bad that a truss will not retain it.

4038. Have you come across any cases of working men being plunged into destitution by being thrown out of employment in consequence of the rupture?—How large am I to assume the rupture to be? Is it to be a big or a small one? If it is a small hernia it does not incapacitate a man from working provided he wears a truss, but if it is what is called a scrotal hernia his capacity for work may be seriously limited, as these ruptures are difficult to retain by a truss.

4039. (Dr. Legge.) Is not rupture a frequent cause of rejection of recruits for the Army?—It would be a certain cause of rejection.

4040. Why is that?—Because if the hernia comes down they are not eligible for employment in the Civil Service or the Army or Navy.

4041. But if it is a slight hernia, and can perfectly well be retained by the wearing of a truss, why should it lead to rejection?—I do not know. Until quite recently the Army and Navy authorities rejected candidates who were the subjects of varicocele, until the Council of the College of Surgeons advised the Director General of the Army that they considered this disease ought not to incapacitate for service.

4042. Can a similar line be taken with regard to hernia?—Yes, it might, but it ought not, for hernia is dangerous to life under the varying conditions of their arduous life, for there is more danger attaching to a rupture, because with straining or coughing, or not having the truss in the right place, it might develop serious conditions.

4043. The fact that a man had a rupture would enable him to malingering, would it not?—It might, and I think would.

4044. Is that one of the reasons, do you think, which has made the Examining Board adopt the rule with regard to men who are ruptured?—I do not know. I may say that over 25 per cent. of the ruptured male population occur under the age of ten years.

4045. (Chairman.) That conclusively shows that it is not an industrial disease, does it not?—Yes, I think so.

4046. Are you in a position to give the Committee some information on the subject of housemaid's knee?—Yes. One has a large experience of it in hospitals. I was surgeon to St. Bartholomew's Hospital for 40 years, and this disease came under my notice repeatedly.

4047. Is the complaint specially one which applies to housemaids?—Yes, nearly always.

4048. Were the great majority of the patients who were suffering from it employed in domestic service?—Yes, they were mainly caretakers or housemaids, or general servants. There is also a bursa on the elbow which is called the miner's bursa, and there is one on the inside of the knee which is called the rider's bursa. There is also one on the buttock which is known as the weaver's bursa, but they are all owing to injury or disease.

4049. Is the housemaid's complaint especially the one on the knee?—Yes.

4050. "Housemaid's knee" obviously would not cover other injuries, would it?—No, but all these bursæ are the outcome of intermittent pressure.

4051. Do they incapacitate from work?—Numbers go about doing their work with them; they are only incapacitated when they become inflamed and suppurate.

4052. Does that occasionally happen?—It not infrequently happens.

4053. Do you think housemaid's knee is caused by the employment in which they are engaged?—Yes, I should say in a large majority of cases. They do not get this disease in France, because they clean with their feet or with brooms. A very celebrated surgeon from France was shown a case, and he did not know what it was; they never see it there.

4054. For how long a period might a person be incapacitated in a bad case?—Until it is removed. They sometimes get so big, or interfere with the patient's work so much, that they have to be removed.

4055. Do you ever have cases of permanent incapacity?—No, I have never seen one which could not be cured, and some are so trivial that practically speaking they require no treatment.

4056. Do the other bursæ of which you spoke

especially occur in particular employments?—Yes; the one on the elbow is called the miner's bursa.

4057. Is it the same thing as the miner's beat hand and beat knee?—No, it is due to working the coal or other mineral while resting on their elbows.

4058. To what trade does the one on the buttock apply?—To weavers; it is sometimes called the weaver's bottom.

4059. Does that incapacitate from work?—No, because it becomes so thick that they can go on with very little inconvenience.

4060. Do they never lose their employment, or are prevented from working for a time?—Sometimes, if inflamed, but it is comparatively rare. The Spital-fields hand weavers used to have it a great deal, but the trade has gone, practically speaking, and consequently this disease is now rarely seen.

4061. Have you any idea how prevalent housemaid's knee is among domestic servants?—No; they nearly always go to hospital, and if the knee is only slightly enlarged with a little fluid, it is let out and they get temporarily well. Some do not seek further advice, but others go from hospital to hospital, so that really one cannot tell what the percentage is.

4062. Would you say it was a very prevalent complaint?—Yes.

4063. Do you think servants ever lose their employment through it?—Yes, I think so occasionally.

4064. So that it might be a proper subject, might it, for compensation under the Act?—It is the outcome certainly of employment necessitating the use of the knee or the elbow.

4065. (*Dr. Legge.*) Is there any generic term which one could apply to this form of disease which would enable us to deal with it in a group?—I hardly know. The disease may give no trouble for months or years, but it suddenly becomes inflamed, but what the cause

of the inflammation and suppuration may be is difficult to say. In many cases I think it is caused by some septic material in kneeling which attacks the weak part.

4066. It would be always necessary to use the word "inflamed," would it not, for the purpose of description?—No; but in the majority of cases it would be. If a bursa becomes big or painful patients cannot kneel until something is done to remove it.

4067. If it is not in an inflamed condition?—Yes, we very commonly remove them when they are not in an inflamed condition, because their removal gets rid of the disease and its disability.

4068. Do you get these cases as in-patients in the hospital?—Yes.

4069. For how long a time?—It depends—from four to six weeks.

4070. Do they recur after once being removed?—The same one cannot, but there are many bursæ about the knee-joint, and some of these may become affected later on in life.

4071. As a rule is it a permanent cure if one is removed?—I should say if I operated on a girl and removed the bursa she would be perfectly cured.

4072. (*Chairman.*) Can the complaint be diagnosed with certainty?—Yes, by a person who knows anatomy and surgery, but I have seen a housemaid's knee treated as fluid in the knee-joint.

4073. Could fluid on the knee-joint be mistaken for housemaid's knee?—I have seen it.

4074. (*Professor Allbutt.*) Do you think by using housemaid's mats the disease could be lessened?—I think so.

4075. (*Chairman.*) Has this complaint any name of greater dignity than housemaid's knee?—Yes; the prepatella bursa.

Mr. H. MONTAGUE MURRAY, M.D., called and examined.

4076. (*Chairman.*) Are you a doctor in practice in London?—Yes. I am senior physician at Charing Cross Hospital.

4077. Are you able to give the Committee some information on the subject of fibrosis of the lungs produced by asbestos dust?—I have had experience of one case, which I had under observation for fourteen months.

4078. Is your evidence limited to that case?—I am afraid so, because at the time it occurred, which is seven years ago, I looked for statistics, but could find none, and since then I have not come across another case.

4079. Have you heard from any quarter that the disease is prevalent among those employed in the work?—One hears, generally speaking, that considerable trouble is now taken to prevent the inhalation of the dust, so that the disease is not so likely to occur as heretofore.

4080. Do you think it still may occur?—If there is dust, certainly.

4081. Have you any doubt in your mind that asbestos dust does cause fibrosis?—I think there is no doubt it did in this one case.

4082. Can you tell the Committee the particulars of that case?—The patient was a man 33 years of age. He had been at work some 14 years, the first ten of which he was in what was called the carding room, which he said was the most risky part of the work. He volunteered the statement that of the 10 people who were working in the room when he went into it he was the only survivor. I have no evidence except his word for that. He said they all died somewhere about 30 years of age. After he had been there 10 years he was put into another room, where there was much less dust. During the latter part of the 10 years he had had two attacks of what were diagnosed as bronchitis, which incapacitated him for a few weeks. In 1899, after he had been at work some 13 or 14 years he was sent to me, and I found he had marked pulmonary fibrosis, which was more like potter's asthma than anything else I had seen.

4083. What was the outcome of it?—He improved. He was ill for a month before he came to the hospital, but after being there two months he went back to his work. That was in the spring of 1899. He worked for some months, then became ill again, and was readmitted to the hospital in April, 1900, where he died.

4084. Was your diagnosis verified by a post-mortem examination?—Yes.

4085. Were there any tuberculous symptoms?—No; there were enlarged glands in his neck, but they were not tuberculous.

4086. If, after his first attack he had not gone back to his work, do you think he would have survived?—That I can hardly say, because his first attack of so-called bronchitis was some years before I saw him. The disease was so far advanced when I first saw him that it was simply a matter of time.

4087. (*Professor Allbutt.*) Will you describe what you found on examination of the lungs?—They were extremely tough and fibrous, especially the lower parts.

4088. What was their colour?—In parts a greyish black.

4089. Were there large and visible strands of fibre traversing the lung, or was it a finer fibrosis penetrating in all directions?—In the lower part the change was uniform, about the centre the grey areas were intermingled with reddish areas containing some air. In the upper part there was comparatively little change except increased toughness.

4090. Was there much pleuritic adhesion?—Yes.

4090*. Did you go further into any minute examination by microscope or otherwise?—Yes. I have here some photographs which were taken under Dr. Legge's direction from specimens prepared for me by Dr. Bosanquet.

4091. (*Dr. Legge.*) Can you tell the Committee what asbestos is?—It consists chiefly of magnesium and silica with some iron and lime.

4092. (*Professor Allbutt.*) Are these spicules spicules of asbestos?—Yes.

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4093. Was there much dilatation of the bronchial tubes?—Not much.

4094. Might asbestos be found in the sputa?—Yes; we examined the sputa and found definite dust, but could not definitely distinguish it from other dust of similar character.

4095. Were there no chemical means of distinguishing it?—No, because in ganister disease there might be as much silica in the lungs. Portions of the lungs were analysed afterwards, but the analysis did not give any further assistance.

4096. There would be then no handy method at the service of a medical referee, would there, of deciding by the sputa whether a person was suffering from asbestos fibrosis or not?—I doubt it; I never heard of any.

4097. From your experience in that particular case, do you think by examination of the sputa you could distinguish another case if you came across one?—No; one could give a probable diagnosis, but could not be definitely certain the disease was not due to some other form of siliceous dust.

4098. We have been told that there is something characteristic in the earlier stages of dust-phthisis in the predominance of shortness of breath before physical signs become very obvious; was that the case here?—

Yes. When this man first came to the hospital he only complained of shortness of breath. His pulse was 65, and his respirations were 33.

4099. So that it is in accordance with your experience that there is something characteristic about the far greater incapacitation of the patient than the comparatively few physical signs would account for?—Yes.

4100. Does your case illustrate this general rule?—Yes.

4101. (*Dr. Legge.*) Was the sputum examined for the presence of tubercle bacilli or not?—Yes. None were found.

4102. Did the condition of the lungs on the post-mortem examination suggest any tubercular cavities?—No.

4103. In your experience at Charing Cross Hospital have you come across cases arising from any other dusty occupations which showed symptoms similar to these?—Not precisely the same; I saw two or three cases some years ago arising from brass dust, in which there were much the same symptoms, but the disease ran an acuter course.

4104. Speaking generally, fibroid phthisis, such as this, is not often seen in London hospitals, is it?—That is so.

FOURTEENTH DAY.

Monday, 14th January 1907.

MEMBERS PRESENT:

Mr. HENRY CUNYNGHAME, C.B. (*in the Chair*).
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Mr. SAMUEL POOLE, M.D., called and examined.

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4105. (*Chairman.*) Are you a medical practitioner practising in Wolverhampton and its vicinity?—Yes.

4106. What part of the town do you practise in chiefly?—Pretty well all over the town, but I should think the tendency is more towards the east side and south side of the town than perhaps elsewhere.

4107. Are you officially connected with any of the workmen's clubs, unions, or other organisations?—No, only the Chillington Club, a little club in connection with the works, which I take because it is policy to do so. The Chillington Works—the edge tool people—I took for the reason that I wished to get instruction in this disease by greater experience.

4108. Is that club a men's club or an employers' club?—A men's club.

4109. It is not subsidised by the employers in any way, is it; it is not a shop club, is it, in the sense that everybody is compelled to join who joins the works?—No, it is simply a voluntary club, and consists of the men who work at that particular kind of work, because there are a great number of workmen in those works.

4110. What particular kind of work?—Grinding and polishing. It does not include the men who do forging.

4111. Is your practice connected chiefly with the men, or is it a general family practice?—It is a general practice.

4112. In the course of it do you come across a good many workmen who are ill from one cause or another?—Yes. I have charge of the district under the Poor Law, which includes that area on the east side of the town as well.

4113. With regard to the general health of Wolverhampton, would you say it is a healthy place or not?—Taking the town generally, it is a healthy town.

4114. With regard to lung disease found amongst

metal polishers and grinders, is it only one metal or all the metals which are polished?—Steel or iron—I do not mean brass.

4115. In grinding I suppose there are a great many different kinds of processes. Have you been into the factories at all?—Yes.

4116. Are there a good many different sorts of grinding apparatus?—Yes.

4117. I suppose you may have what one might call moist grinding, where a little water is used; and I presume there is also what one might term the complete wet grinding, where you have a regular stream of water pouring over the work? Have you seen that latter kind of grinding?—I cannot say that I have.

4118. That would probably be quite safe, would it not, as far as dust is concerned?—Yes. In the wet grinding I have seen there has been certainly a large amount of water, but whether the water came from the trough that the stone was running in or not I do not know.

4119. There is, at all events, some grinding so wet that it would be inconceivable that dust could get into the air from it at all, is there not?—I should not say so. I think in the very wettest grinding it is likely to fly with the water, because it increases the weight of the particles which may fly off at a tangent. I do not think you could see the splashing, but it takes place. If a stone is revolving at a great speed in water there must be water flowing off at a tangent, and if there are any particles in that water it must carry them off.

4120. But you do not see any wet or dust on the troughs or places round about, do you?—No, perhaps not.

4121. If there is no dust to be found and no wet to be found, and you cannot feel any or see any, you are warranted, are you not, in concluding that the process

of wet grinding is very much less dangerous than that of dry grinding?—Quite so.

4122. There are emery wheels as well as stone wheels of different kinds used, are there not?—Yes.

4123. What is the method of polishing which you have generally seen here?—I have seen polishing done for flat irons, especially with moist stones.

4124. Do you call that polishing?—Yes, that is the polishing they do.

4125. What I meant was polishing with powders of different kinds—do you mean that kind of polishing?—Yes; they polish smoothing irons with dry stones, but of course it is all grinding.

4126. What polishing is there, to your knowledge, carried on with bobs?—That is done at the bicycle works a great deal.

4127. Do you mean polishing with calico bobs and leather straps?—Yes. I do not quite know what the straps are made of, but they use straps.

4128. What effect do you think the grinding and polishing has on the health of the men employed?—I think at the works that I have seen the process is very certain in its effect in producing fibrosis—of course, I am referring now to grinding with the grindstone especially.

4129. Dry grinding?—No, wet grinding. I have had a great number of men under my care suffering from fibrosis, and I dare say my statistics will show that there is no doubt their complaints have arisen from the grinding.

4130. Could you put your ideas into figures? Supposing a young man began to grind, say, at the age of 21, how long would he be able to continue?—They generally commence a year or so before that—at about the age of 18. Employers will not start them earlier under the present union rules, though I believe they used to start grinding as early as 14 years of age.

4131. Supposing a man started grinding at the age of 18, could you form any idea at what age he would begin to develop fibrosis, and how many out of 10 men would you expect would get it, and at what age would they get it?—I should not say that fibrosis of the lungs would be very definitely developed in 10 years in the case of a young man starting, say, at the age of 18 or 20. It would not be well marked up to the age of 30, because I think the system would resist it.

4132. At what age would you expect to find it?—Taking the general run of cases, as far as I can make out it would be from about 36 to 43 or 44.

4133. Do you say, in fact, as a general rule, that it would take 20 years of grinding for the symptoms to begin to manifest themselves?—Yes; if a man was apparently free from any predisposition, I should think it would be quite that time before there were any well-marked symptoms appearing. Perhaps he might have an attack now and then of bronchial trouble, which is of very frequent occurrence, and which is attributed rather to catching cold; still, even then you can see there are well-marked symptoms of other troubles beyond those of mere bronchial catarrh producing an unhealthy appearance in a man who is so affected—he looks bad.

4134. As a general rule does the really serious trouble begin in 20 years?—Yes, I think so, very frequently.

4135. Taking 10 men starting free from disease at the age of 18 years in the grinding trade, how many would you expect to find showing marked signs of fibrosis by the time they were 40 years of age, supposing they had been working in rather bad shops?—I should think only one or two.

4136. Would you say that perhaps two out of 10 you would expect to find would begin to be seriously troubled at 40 years of age?—Yes.

4137. Supposing you again visited the same men at the age of 45 or 50 years, what would you expect to find their condition to be?—As to that I do not know that I could give you any definite answer. I have not prepared any statistics, but I should think you would find three or four who would be affected at the age of 45. I have several men in the club at present who are 45 years of age, and there are four or five cases which are just commencing; but still there is no doubt as to what the trouble is. There are about 38 men in the club altogether, and they are all under 45, I think; but I have four well-marked cases amongst them.

4138. Is it your opinion that by the time young healthy men have worked 20 years at this trade in a bad factory, one out of five would begin to show some serious trouble?—I think so.

4139. And when they reach the age of 50, I suppose the percentage would be increased?—Yes, I think so.

4140. Have you formed any opinion as to the expectation of life of men who work at this grinding work in a rather bad factory, as compared with the expectation of life of men engaged in ordinary occupations?—Yes. I think the expectation of life amongst men engaged in this calling is very much lower.

4141. Can you put it into figures at all?—It would be very difficult to do so, but from a number of cases I have collected I have arrived at the conclusion that the average age of the people engaged in it is 44 or 45 years. I am taking the average number of men I have known who have died at the age of 43 to 45. I may say that in making inquiries amongst the men themselves I find that if a man lives to 50 in this business he is looked upon as an old man; and when a man is 50 he looks quite seven or eight years older than he really is.

4142. Would the whole of the people employed look haggard, or only some of them?—All of them except the very young people.

4143. Would only some of them have serious trouble, or would there be many of them whose health would be more or less impaired?—I think in a bad works they would all have serious trouble.

4144. Is there a good deal of difference now between the conditions in works in the sense of some of them being much less dangerous than others?—Yes, I should think so; but I cannot say that I have had much experience as to many different kinds of works.

4145. Have you come across some grinders who have been employed in some works who do not seem to have been affected much, even where they have had no fans or hoods?—In connection with the emery wheel I think there has been very great improvement made in Wolverhampton recently.

4146. Do you mean that working with the emery wheel is not so dangerous as working with the stone wheel?—Yes, I think so; but they are using fans more now. I have not noticed that the emery wheel is so dangerous, or so markedly dangerous.

4147. You could find some men engaged in grinding who are healthy men, I suppose, could you not?—Yes.

4148. Is it your opinion that the occupation of a grinder must be a dangerous occupation, or could a great deal be done to make it a relatively safe occupation?—As I have seen it I should think the occupation is a very dangerous one indeed, but I do not say it cannot be improved and made less dangerous. From my experience of it I think it is nearly certain to be fatal in the end.

4149. But you only gave a figure of two out of 10, did you not?—That was up to the age of 40; if they went on longer they would be almost certain to get fibrosis of the lungs.

4150. Would you say that if they went on to the age of 65 they would all have fibrosis of the lungs?—Yes. But, of course, then there might be other things supervening which might hide the fibrosis—there might be some other disease which would attack a man and take him off.

4151. On the other hand, I suppose you do meet with a certain number of grinders who escape fibrosis altogether?—That is rather a difficult question to answer. The men who have been engaged in this work who have come under my notice have come to me, nearly all of them, in consequence of lung trouble, except perhaps in certain cases, where they have had rheumatism.

4152. You would not see the healthy ones at all, I suppose?—No; of course they would not come under my ken at all.

4153. (Professor Allbutt.) Do you think it is very difficult to distinguish between fibrosis produced by alcohol and fibrosis produced by other causes?—Yes.

4154. Have you had much experience with regard to autopsy in these cases?—No.

4155. In the statement which you have furnished to the Committee you have mentioned one or two cases, but I suppose they were accidental cases?—Yes, quite so.

4156. Have you happened to see an autopsy on a

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workman who had died from some accident, for instance, after he had been engaged for some years as a grinder?—No. I think it is rather rare to find cases of accident in connection with these men, except in the case of a stone breaking and striking them.

4157. Is the trade of which we have been speaking the only trade of Wolverhampton?—No.

4158. Have you seen fibrosis developed in other trades in this town?—I have not; but I think that basic slag work gives rise to fibrosis.

4159. If you examined a man of 40 years of age who had been engaged as a grinder, and you did not know that he had been so engaged, would you be able to say that he had worked at that trade?—I think it would be possible to do that, because you can detect some fibrosis which is due to mechanical causes; I think they are fairly definite, but I do not say it would be so in all cases.

4160. It is always very difficult to bring general principles to bear on individual cases. But supposing a man claimed compensation, and you knew of your own knowledge that his cough and shortness of breath were out of all proportion to the physical indications found in his lungs, would that make you fairly certain that the disease from which he was suffering was pulmonary fibrosis?—I think so, because it is so very marked.

4161. You can distinguish between one man who has tuberculous consumption, another with emphysema, and another with fibrosis?—Yes, but emphysema is in patches.

4162. What I mean is that a man who is not a grinder may have ordinary emphysema: do you think you could pick out grinder's fibrosis from such cases?—Yes, I think so. There is not necessarily much fibrosis with emphysema conditions in an ordinary man.

4163. And the clinical story is a different one from that of ordinary phthisis?—Yes; you get the retraction of the lungs so marked.

4164. When you go into these shops can you see the ill-effects of their employment in the large majority of the men?—Yes, I should say so.

4165. Can you say whether there is any difference in the aspect of the men, from a medical point of view, employed in good shops and in bad shops?—I cannot say that my experience is so great as to be able to say which is a good shop and which is a bad shop. I have been into a good shop where the grinders look fairly well, and I have been into a bad shop where they bear the aspect of grinders, but I would not like to say definitely which was the man employed in a bad shop and which was the man employed in a good shop, because I think they are all bad.

4166. Is there any shop so good that you would not be able to say, taking the appearance of the men, that there was anything the matter with them?—I do not think that the men look so easy and natural as ordinary working men; they are more pale.

4167. Comparing them with the workmen in other trades, do they present a different appearance?—Yes, I think so.

4168. In your statement you say: "I have never seen a grinder without fibrosis."—Will you explain to the Committee what you mean by that?—I do not, of course, examine every grinder; I am only speaking of men who have come to me in cases of sickness. We do not examine every grinder at work at a certain age, and probably you might find some who are not affected at all, but those who come under our notice have been affected with something, though very frequently they do not complain of the lungs.

4169. With regard to the entries in Table 6, which you have furnished to the Committee, are they consecutive or selected entries?—That is simply a list of men: when they started work; what age they are at present; and whether they have suffered from chest troubles. I should explain that they have not all been under my care.

4170. Is the list a copy of the sick list of the club in connection with any works?—It is a list of the men in receipt of sick pay, taken from the books by the secretary. Of course he does not know exactly what their troubles have been except that they have been chest troubles. I cannot vouch for the truth of the list, and can only tell you that it is taken from the books.

4171. What is the name of the secretary?—His name is Vincent.

4172. Do grinders drink harder than other classes of men?—Not all of them, but I think they are, perhaps, as a class, very much addicted to drink.

4173. Is there anything in the nature of their employment which leads them to that, do you think?—I could not say; but it is a very common thing, where there is dust about, for workmen to drink.

4174. Because alcohol, in excess, disposes to tuberculosis, does it not?—Yes.

4175. Do I gather from you that you consider ordinary phthisis is more prevalent amongst this particular class of men than amongst others?—No, I do not think it is.

4176. (Dr. Legge.) How many years have you been in charge of the Cullingington Sick Club?—I think five or six years, but I really could not give you an accurate statement. Of course I come across a number of the people as Medical Officer of the parish district.

4177. How long have you been in charge of the parish district?—Nearly 12 years.

4178. As parish doctor do the grinders come under you as incurable cases?—No, they came to me as grinders suffering from some trouble, generally the chest.

4179. But as parish doctor you would have under you, I suppose, grinders who were incapable of continuing their work?—Yes, because the clubs only pay them for a certain time—six months I think it is.

4180. Are there a number now receiving outdoor relief who are suffering from this disease?—No, I have not any myself now receiving outdoor relief.

4181. I thought you said that you had had cases?—Yes, I have had cases during the last 12 years; I had four cases recently, but the patients have died.

4182. Were they rendered incapable of work, and can you say how many years on an average they lived after they gave up work?—I can tell you with regard to the last four cases I had. I had a case of a man named Pearce, who was 36 years of age. I attended him for about seven or eight months, but he then went to another district and was under the care of another medical officer.

4183. Is that man alive?—No, he is dead. Then there was another man named Priest, who was ill about four years.

4184. Can you say how long they do live after they give up work?—One man died at the age of 36, about 18 months after he gave up his work. His father was also a grinder, and died fairly young. The man Priest was a grinder, and lived until he was 53 years of age.

4185. How long was it after he had given up work that he died—how long was he an invalid?—About four years.

4186. Do you remember how long he had shown symptoms and had still been able to continue work?—No, because I did not see him until he came under my notice after leaving his employment. One of the men I have named in the list you have was at work until within three months before he died.

4187. Do you think you could take five years as the limit of life after the disease has become apparent in them?—I think after they began to show symptoms, if they gave up the work and there was no deposit of tubercle, they would recover to some extent.

4188. Do you actually know of cases where there have been signs of fibrosis and the man has left the work and taken to some healthy employment and recovered?—Yes. I made inquiries, and I did find one man. He left work suffering from his lungs. I did not attend him, and he did not come under my observation, but I am told he left the work for three years, got better, and has started it again.

4189. So that fibrosis in itself is not necessarily fatal if a man can give up the work in time?—It will produce bad effects later in life; if you get fibrosis early you do not again return to a natural condition.

4190. But would not any damaged portions heal up?—Yes, but the contraction would produce further damage.

4191. Even supposing the work were given up?—Yes. I think if the irritation is removed by leaving an employment or occupation giving rise to the irritation,

there is no further formation of fibroid tissue, or if there is it is very slow in its process, and the individual lives; but if a scarred tissue is once formed I do not see any possibility of getting rid of it, and once it is formed it must produce its effect later on.

4192. (*Professor Allbutt.*) Do you find, generally speaking, amongst working men of the age of 60, that the marks of senile decay, degeneration, emphysema, etc., are very considerable?—Not necessarily so; I think there are a great number of men who are very healthy at that age, and I have come across many. I should not put them down as senile at the age of 60.

4193. Then I suppose up to the ages you have spoken of there would be no difficulty in distinguishing between cases of mere senile decay and cases of fibrosis?—Fibrosis would start earlier.

4194. If a man arrived at the age of 60 and developed emphysema what would you say?—I think emphysema is of a more marked character, because you get it in patches in fibrosis.

4195. (*Chairman.*) Taking the case of a man of 18 up to about 30, he would not show many symptoms, I suppose, except occasionally a little bronchitis?—I do not think he would show much. I think he would stand the work all right up to then—his system would resist the effects.

4196. Supposing the men employed in this kind of work were included in the third schedule of the Workmen's Compensation Act, it would possibly end in turning out of the trade the older men, would it not?—But there are so few of them who are really old.

4197. But would it not mean that those men beginning to work in the trade at 18 would have to stop at 35 years of age, and then go to some other employment?—Yes, probably.

4198. Are not the conditions such that if they became the subjects of compensation it would very probably end in men working at the trade until they were 35 years of age and then taking up some other occupation?—Yes, and I think they would be very wise if they did.

4199. Supposing they turned to some other occupation at the age of 35, before any marked symptoms had shown themselves, do you think they would be likely to recover to a certain extent?—I think their expectations of life would be greater than if they continued at the work, certainly.

4200. There are other occupations a man who has been a grinder could take up, I suppose? Do grinders change their occupations much as a rule?—No, I do not think they do. I think they stick to their work.

4201. Then would there not be a tendency for them to become what you might call an unemployed class at the age of 35?—Yes, but you see it is a very simple kind of work—although it is hard work it is not skilled work.

4202. Have you any razor grinders in this town?—No; that is more skilled work.

Mr. HENRY MALET, M.D., called and examined.

4215. (*Chairman.*) Are you Medical Officer of Health for the County Borough of Wolverhampton?—Yes.

4216. There are no statistics apparently available, are there, with regard to life and death of men employed in the grinding trade?—Not that I am aware of. The particulars furnished to me do not contain any information as to occupation; the Registrars may get those particulars, but I do not.

4217. Are you able to throw any light on the question of the safety or otherwise of this particular occupation?—Of my own personal knowledge, none.

4218. What would you say with regard to the matter from what you have learnt or know?—I know that the inhaling of any irritating dust is certain to cause trouble, but I do not think that is quite what you mean. If you want to know whether I have any special knowledge on the subject, I have not—that is to say, in my own practical experience here.

4219. Do the death returns show cases of death from fibroid phthisis?—As an actual matter of fact, I think I hardly ever get that cause of death specifically given.

4220. What sort of return would you get?—Simply phthisis or tuberculosis of the lungs. Fibroid phthisis

4203. (*Professor Allbutt.*) Do the men employed in the work consider it a dangerous occupation?—No, they do not think anything about it.

4204. Do they not realise that it is dangerous at all?—No, they do not realise it at all.

4205. Do they not consider it?—No, they do not consider it—or rather they do consider it in a way, because I have spoken to a great number of the grinders, and have talked about the age to which they live, and they all say, "Well, we know he is an old man at 50." That is the way in which they speak of themselves and their trade.

4206. (*Chairman.*) In your view ought the employment to be made as safe as it possibly can be made by the use of suitable apparatus?—Certainly.

4207. Secondly, do you think that it would be a very good thing to get men to leave the work at the age of 35 or thereabouts?—Yes, it would be if they have not been affected in the least degree, because if they continue, as far as I can see, they are bound to become affected.

4208. Can you tell the Committee anything with regard to the basic slag industry?—My experience is very small with regard to the basic slag industry. I have tried to find out as much as I could about it, but I do not think I can say anything about it from a professional point of view. Apart from what I have indicated to the Committee I do not think I can tell you anything.

4209. (*Dr. Legge.*) Amongst your patients have you had cases of illness which you have attributed to the inhalation of fumes from ammonium chloride?—No, except that I have had cases in which my patients have complained of bronchial catarrh.

4210. Do you know of any inquiry that has been made into the subject of galvanising work and the effect of ammonium chloride fumes?—No.

4211. Your attention has not been drawn to the effect of ammonium chloride fumes in the same way that it has been drawn to the results produced by the grinding trade?—No, not at all.

4212. Do you know whether galvanising is a large industry in your district or not?—There is a good deal of galvanising done here, and the tinning of hollow ware, if that be the same thing. I do not know if they use spirits of salt, but these particular works use chloride of ammonia.

4213. Is there anything to distinguish the symptoms produced by the inhalation of those fumes from that of ordinary bronchial catarrh?—No, not that I am aware of, except that a man complains of a certain amount of dyspeptic trouble.

4214. Have you had any cases under your notice which you believe to be due to the effects of arseniuretted hydrogen given off in the process of galvanising—for instance, such as jaundice, etc.?—No, I do not know that I have.

is very seldom returned as a cause of death, and even then it need not be fibroid phthisis caused by irritation. All phthisis is more or less fibroid phthisis.

Mr. H.
Malet, M.D.

4221. (*Professor Allbutt.*) Do you think that the number of deaths arising from chest diseases is high in Wolverhampton?—No, I do not think it is; compared with other towns I think our returns are very favourable.

4222. Then the returns do not suggest to you that there is any particular element in Wolverhampton which would lead to the death rate being higher from those causes?—No; and even if the grinders of Wolverhampton were specially affected they constitute a very small proportion of the population. They might have an effect on the phthisis returns alone, but taking the whole of the deaths from respiratory diseases I do not think the figure is a very serious one.

4223. May I take it that the number of cases of phthisis amongst grinders, even if excessive, would not be sufficient to load the figures unduly?—Yes.

4224. (*Dr. Legge.*) Have you any idea as to the number of grinders there are in Wolverhampton and the district?—No, I have not.

Mr. H. 4225. Is that information not given in the Census
Malet, M.D. Returns?—I suppose it would be, but I do not know.

14 Jan. 1907. 4226. Is there any occupation entered in a certificate of death when information is given to the Registrar?—No, I do not think so. May I state that I have seen a certificate from a Registrar given to an insurance company in which there was entered the occupation of the deceased, but on the certificate of death no occupation is entered.

4227-8. I get copies of certificates of death in which the cause of death has been given as lead poisoning, and on that the occupation of the deceased person is stated?—They must be special certificates. When a person goes to the Registrar of Births and Deaths the Registrar asks a certain number of questions, but what they are I do not know.

4229. Is not a copy of the information furnished to the Registrar sent to the Medical Officer of Health?—No; the only particulars which are sent to us as Medical Officers of Health are these: we get a list each week of the total number of persons registered; the names; the ages; place of death and cause of death—that is all.

Mr. T. RIDLEY BAILEY, M.D., called and examined.

Mr. T. R. 4236. (Chairman.) Are you Medical Officer of Health
Bailey, M.D. for Bilston?—Yes; and I am Certifying Factory Surgeon for the district.

4237. Can you tell the Committee anything with regard to the galvanising industry, and the injury to health caused to workers in the trade?—I have no knowledge of any special injury other than that caused by arsenic and lead, and the injury caused in connection with the arsenic, I believe, was caused by a mistake.

4238. Is not arsenic commonly dangerous then?—No; of course it is always to be anticipated, but we do not get much trouble with it.

4239. Galvanising is done with zinc and lead, is it not?—Yes.

4240. What is the danger with regard to galvanising work?—I think it arises from the fumes.

4241. What is the stuff which is used as flux?—I am not quite sure, but I think they use ammonium chloride, and of course you have the fumes of chlorine and hydrochloric acid.

4242. Have you seen men who have been affected by those fumes?—No, not seriously.

4243. Can you give the Committee any information with regard to basic slag?—We have only one works in the district, and I have never had any notification of any special trouble in connection with them. Of course no notice comes to me except in the case of accident, and with regard to the treatment of the men I have no special experience.

4244. (Dr. Legge.) Do you know of any inquiry which has been made as to the effect of the galvanising processes?—I think I have heard of one, but I have no recollection definitely about it.

4245. Were not you consulted when the Committee on Dangerous Trades sat here in the year 1897 or 1898?—I do not think so.

4246. How long have you been in practice in Bilston?—About 23 years.

4247. You said, did you not, that there were fumes arising from hydrochloric acid?—Yes.

4248. Have you noticed any effect from that on the teeth of the workers?—No, not specially.

4249. Have they consulted you with reference to any such thing?—No; I have had no special consultations with regard to such a thing.

4250. With regard to arsenic, what form did the arsenical poisoning take in the particular cases you investigated?—It caused a considerable amount of jaundice and gastric disturbance, and the men broke down, but they all recovered eventually—it was a matter of a few months.

4251. That was due to arseniuretted hydrogen poisoning, was it?—Yes.

4252. Would you consider that that would be understood as arsenical poisoning?—I do not know that we

4230. Then you do not get a copy of the Registrar's information?—No, not the whole information.

4231. Can you say whether the mortality from phthisis amongst the male population of Wolverhampton is greater or less than amongst the female population?—I could not; but of course I could get that information for the Committee for the last few years.

4232. Could you get it for definite age periods—say decennial periods?—Yes, I will do so.

4233. (Professor Allbutt.) You are physician to the Hospital here, I believe?—Yes.

4234. Do you see any cases of fibroid phthisis there?—Yes, I do; but if you had asked me off-hand three days ago I could not have said that I could recollect having seen a case of fibroid phthisis for years. However, it so happens that the very last day I was there—that was on Saturday—I saw a man who had fibroid phthisis, and it at once struck me that I might have seen cases like it once or twice a fortnight, but one does not make a mental note of such things.

4235. I suppose that kind of case would not be taken into your hospital?—No.

considered at the time that it was due to arsenic in the ordinary way; it was really arseniuretted hydrogen inhalation.

4253. The Committee which reported on the galvanising trade seemed to think that the fumes might affect young workers under 18 years of age—what is your opinion on that point?—I dare say they would.

4254. Are there any such workers employed in galvanising works?—The galvanising work is generally part of a general ironworks in our district, and of course there are young people employed all over the works.

4255. Have you to examine them?—Yes; but not with regard to the galvanising work specially. I am not aware that any of them go particularly to work at galvanising at first, though they may be sent there afterwards.

4256. Do you know of any factories where they take steps to remove the fumes by ventilation?—I think most of the factories in our district have been improved in that respect.

4257. In what way?—They have improved their ventilation generally—I do not know that there is any special apparatus used.

4258. Are there any mechanical means for taking off the fumes, to your knowledge?—I am under the impression that I have seen some, but I do not know where.

4259. Do you know what the material is with which the galvanising bath is heated—is it coal or coke?—I think it is mixed.

4260. Have you had any cases of carbonic oxide poisoning from the effects of fumes?—No.

4261. May I take it, then, that your evidence is altogether negative?—I think so, and I am sorry I cannot help you more.

4262. (Professor Allbutt.) Are you in active practice?—Yes.

4263. Is your practice amongst the working classes?—It is an artisan district.

4264. Have you any clubs in your district?—Very few.

4265. Do you generally know the trades in which the people you attend are engaged?—Yes.

4266. Would you say, for instance, as regards basic slag that your patients employed in that work presented any characteristic symptoms?—No, I do not think they do.

4267. Would you say the same thing with regard to the other trades of which you have spoken?—I do not think they do. I heard part of Dr. Poole's evidence, but phthisis is not common with us.

4268. (Dr. Legge.) Is grinding carried on extensively in your district?—No; there are no grinding works, as such, at Bilston.

FIFTEENTH DAY.

Tuesday, 15th January 1907.

Notes of examinations made by Professor Clifford Allbutt and Dr. Legge at Messrs. Chillington's Works.

- No. 1.—Aged 55. Employed as wet grinder between 38 and 39 years. In present employment 27 years. Symptoms: Negative, has no cough, and feels no effect from employment.
- No. 2.—Aged 36. Employed in grinding and polishing 23 years; 14 years as wet grinder. Symptoms: Slight cough, but good wind; better on the left side than on the right.—Expiration sound—rather prolonged. No anæmia.
- No. 3.—Aged 41. In present employment 20 years. Wet grinder all his life. Symptoms: Imperfect expansion; feeble; rather harsh inspiration—cough.
- No. 4.—Aged 29. In present employment 15 years. Wet grinding three years; polisher before that. Symptoms: Well nourished, no anæmia, breath sound, weak heart—thin in front, harsh at right apex.
- No. 5.—Aged 37. Employed as wet grinder 15 years. General labourer before. Symptoms: Slight cough, good wind, no effects from employment up to the present.
- No. 6.—Aged 32. Wet grinder for 14 years. In present employment 10 years. Symptoms: No cough. No emaciation or anæmia. Chest drags on inspiration. Breath sounds breathing, lower half of right lung behind.
- No. 7.—Aged 24. Employed as wet grinder. In present employment 2 years. At Messrs. Perks and Co. 4 years. Symptoms: No cough or shortness of breath; defective breathing, lower half of right lung behind.
- No. 8.—Aged 36. Employed as wet grinder 4 years. With Messrs. Perks and Co. 11 years. Symptoms: No shortness of breath or cough. Very harsh breathing; imperfect expansion.
- No. 9.—Aged 28. Employed as wet grinder 12½ years. In present employment 1½ years. With Messrs. Perks and Co. 11 years. Symptoms: No cough, expansion poor; breathing shallow, no adventitious sounds; no anæmia or emaciation.
- No. 10.—Aged 36. Employed as wet grinder nearly 2 years; as file grinder 16 years. Symptoms: Negative.
- No. 11.—Aged 28. Employed as wet grinder 7 years. In present employment one year, previously 6 years as brass moulder. Symptoms: No cough or effects from trade. Expansion good; breath sounds normal; no anæmia or emaciation.
- No. 12.—Aged 34. Employed as wet grinder. In present employment 2 years; at Messrs. Brades 16 years. Symptoms: No cough or shortness of breath. Slight wheezy inspiration on the right breast.
- No. 13.—Aged 59. Present employment 18 years; dry grinding at emery wheel 4 years; wet grinding at wet stone 14 years. Previously 20 years wet grinding—edge tool grinding. Symptoms: Sometimes has slight cough; no anæmia; muscles wasted; breath sounds feeble; and markedly harsh on left side in front; expansion feeble.
- No. 14.—Aged 32. Employed as glazer on emery bob (dry grinding and polishing). In present employment 19 years. Employed in old unventilated shop without hoods. Symptoms: Negative; no cough to speak of, and finds no ill-effects from the work.
- No. 15.—Aged 47. Employed as glazer in old unventilated shop for 20 years. Previously polishing 13 years in the same trade. Symptoms: A little cough at times; well nourished; no anæmia; expansion poor; breath sounds natural.
- No. 16.—Aged 25. Employed as glazer. In present employment 12 years in old shop. Symptoms: Negative; no cough.
- No. 17.—Aged 44. Employed as glazer of cast-iron articles for 16 years. Glazer of sad irons for 14 years. Employed in old shop. Symptoms: No cough; no anæmia; no emaciation; expansion feeble and breath sounds poor.
- No. 18.—Aged 25. Employed as glazer and rougher. In present employment 9 years in old shop. Labourer previously. Symptoms: Slight cough; wind not so good as it was.
- No. 19.—Aged 42. Employed as glazer. Present employment 6 years in new ventilated shop. Elsewhere 18 years—all edge tools. Symptoms: Negative.
- No. 20.—Aged 23. Employed as glazer in new ventilated shop for 7 years. Symptoms: No cough, no anæmia or emaciation. Chest quite normal.
- No. 21.—Aged 34. Employed as glazer. In present employment 16 years in new shop. Symptoms: Slight cough, but not in the daytime; expansion good; breath sounds natural; no anæmia.

Professor Allbutt and Dr. Legge.

15 Jan. 1907.

GENERAL NOTE.—As a general characteristic there seems to be great difficulty in drawing a full inspiration; there is a considerable drag in the accessory muscles of inspiration; the chest expands very imperfectly, and the breathing generally to the ear is inexpressed, feeble, and ill-drawn.

Notes of examinations made by Professor Clifford Allbutt and Dr. Legge at Messrs. William Edwards and Sons, Limited (New Griffin Works).

- No. 22.—Aged 30. Employed as wet grinder. In present employment 15 years. Symptoms: Inconvenience sometimes from getting dust on stomach. Breathing of both lungs wanting in quality, imperfectly expressed, "woolly" in character. Behind breathing fairly normal at back of left lung, but comparatively defective at back of right lung.
- No. 23.—Aged 29. Employed as wet grinder. In present employment 8 years. Symptoms: Cough in the morning on getting out of bed, but wind good. Expectorates; prolongation of expiration.
- No. 24.—Aged 26. Employed as dry grinder or polisher. In present employment 13 years. Symptoms: Negative.

Professor Allbutt and Dr. Legge.

SIXTEENTH DAY.

Wednesday, 16th January 1907.

PRESENT :

Mr. HENRY CUNYNGHAME, C.B. (*in the Chair*).
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.
Mr. T. E. BETTANY (*Acting Secretary*).

Mr. ARCHIBALD KERR CHALMERS, M.D., D.P.H., called in and Examined.

Mr. A. K.
Chalmers,
M.D., D.P.H.

16 Jan. 1907.

4269. (*Chairman.*) You are Medical Officer of Health for the City of Glasgow, formerly Assessor Examiner in Forensic and State Medicine in the University of Aberdeen, ex-President of the Scottish Branch of the Incorporated Society of Medical Officers of Health, and of the Sanitary Association of Scotland?—Yes.

4270. You have prepared a short statement, which you are handing in to us?—Yes. It is as follows:—

Extent of Metallurgical Industries.—Although Glasgow may be said to be the centre of the coal and iron industries in the west of Scotland, it is so chiefly by way of utilising for trade and export purposes the already produced or manufactured material. There is thus, I think, only one iron work producing pig iron on a large scale, at least within the area of the municipality of Glasgow (W. Dixon and Co., Ltd., Govanhill), and only three, I think, where steel is manufactured (Blochairn (pig), Parkhead (steel), and Springfield Works, London Road (steel). With these exceptions the production of pig iron and steel is mainly confined to the Clydebridge, Newton, Coatbridge, Motherwell, and Wishaw districts of Lanarkshire; while, I think, in Ayrshire the only work producing steel, among the many producing pig iron, is Glengarnock. Most, indeed all of these works, save probably Clydebridge and Newton, are at a sufficient distance from Glasgow to require a resident population, so that, speaking generally, any impairment of the health of the worker, which might be attributed to the processes of manufacture, and especially any deaths resulting therefrom, would fail to be reflected in the statistics of Glasgow. There is another feature of these industries as conducted in the west of Scotland which is worth noting here, because it seems to suggest an explanation of the absence from among the more prevalent forms of disease, and the causes of death in this district, of one group of diseases at least, on which I have been asked to submit evidence, namely, fibrosis of the lung from inhalation of silicious or metallic particles, and pneumonia from the inhalation of basic slag dust. The feature referred to depends on the nature of the production and the methods employed in its manufacture. I speak not from any very intimate acquaintance with the technique of steel making, but as the result of inquiry. The steel makers in the west of Scotland, with only one exception, I believe, produce mild steel in the Siemens Open Hearth Furnace. What is known as basic slag steel, on the other hand, is only produced at Glengarnock.

Death Rates in Certain Industries from All and Certain Specified Diseases.—In order to ascertain the death rates in several occupations exposing the worker to metallic or other dust, I select several diseases as illustrating the varying death rates. (Tables VI. to IX. appended.). These observations are based on an inquiry into the occupational deaths in Glasgow for the years 1901-1902, and the rates were calculated on the number of persons engaged in the several occupations named at the Census of 1901. In order to establish the general accuracy of the numbers living and returned under the several occupations, I have made the following comparison with the numbers living at corresponding ages according to my own report on the 1901 Census for this city:—

Glasgow: Males, ages 25-26 (Census 1901).

Numbers living, according to:—

- (1) Medical Officer's Census Report, and
- (2) Employed or otherwise at corresponding ages, from Registrar-General's Report.

| Ages. | M.O.'s Report. | Census Enumeration. |
|------------|----------------|---------------------|
| 25 to 35 - | 65,768 | 65,822 |
| - 45 - | 46,605 | 46,471 |
| - 55 - | 32,356 | 32,312 |
| - 65 - | 18,351 | 18,414 |
| | 163,080 | 163,019 |

I have prepared some further information contrasting the movement of the general death rate of males and females, going back for a period of thirty years, in order to afford a standard with which the industrial death rates may be compared.

4271. These will all be very valuable to go in as statements of appendices?—Yes, they form Tables II. to V. in the appendix. I do not know that the last table given there is of much importance, except to illustrate the volume of deaths dealt with, and I have not continued the tabulation beyond 1870.

4272. Will you direct our attention now to any parts of your statement which would throw light on the question whether gritty phthisis caught from dust is an important element in considering the mortality in this district; what conclusions would you draw from the statement you have put in with regard, in the first place, to phthisis caused by gritty dust?—I prepared and have brought charts to illustrate the movement of phthisis, and the death rate from phthisis and other diseases of the lungs in Glasgow for a considerable period. These and the tables pretty well contain the information desired.

4273. We have not had time to read the whole of your statement, but perhaps you will give us in your own words the conclusion you draw from this?—I would refer you to the chart showing in quinquennial periods the movement of phthisis in Glasgow since registration began in 1855. It shows the death rate per million for both sexes in quinquennial periods up to 1903, and it will be seen that it represents a continually decreasing rate.

4274. To what do you attribute that steady decrease?—There has been quite a revolution in the sanitary condition of Glasgow during that period. Considerable areas of insanitary property have been removed. That is one factor undoubtedly. Then in that period there

has also been great improvement in the general conditions of living. The standard has been raised.

4275. But now you are talking of phthisis in general?—Yes.

4276. Tuberculous phthisis?—It is not possible to distinguish in the earlier records between tubercular and other forms of phthisis; it is "phthisis" as registered. If there were errors in the certification the errors would be included here, but the "decrease" here shown corresponds in general with the improvement throughout the country. Phthisis has gone down in both sexes.

4277. Is there a difference shown as regards males and females. It is shown in that table.

4278. Have you another table that shows the males?—I have prepared tables and chart to illustrate the movement in the death rates of each sex separately from "all causes"—from "phthisis," from "other respiratory diseases," and from all forms of respiratory diseases, including phthisis, over 30 years. They cover the industrial period of life, *i.e.*, from 25 to 65, and are calculated on the deaths registered during the years surrounding the Census years 1871, 1881, 1891, and 1901. (See appended Tables I. to IV.). As illustration take the age period 25 to 35 for males. In these four census periods you have the death rate from all causes decreasing. In 1870-2 it was 12·8 per 1,000 for males; in 1900-2 it was 9·3. On referring to Tables II., III., and IV. the rate from "phthisis" and from other respiratory diseases has also declined. If you take the females at the same periods you will get a corresponding change. But there are minor differences. The death rate of females is higher than in the case of males at the ages 25 to 35. This is so, notably in the rates for "all causes" and for "phthisis." It remains higher for phthisis in females at age 35, but at later ages the rate for males is more uniformly in excess. It is uniformly in excess from "all causes" and from "other respiratory diseases" after the age of 35. At ages 45 and upwards it is now uniformly higher for males, and during the age period 45 there has been no decrease in the phthisis death rate since 1880. (Table II. Appendix).

4279. And at that point the females begin to pass the males?—Yes.

4280. Apparently at thirty-five the death rate of the males and females is pretty well on a footing, the one not much worse than the other, but if you cut out the age of thirty-five, apparently the death rate all over seems to be less?—I think the hygienic conditions of life for females may be regarded as better, and that you do have industry telling on the males. Of course, there is always a difference through life, even from the infant period—an excess in the rate of male deaths.

4281. If you are going to leave industrial life, clerks in offices ought to show a different result from operatives in workshops?—Yes, and corresponding with that in women.

4282. Have you any information to show that?—No, not showing clerks separately.

4283. Of course, we may say it could be due to the habits of men; they smoke, and drink, and so on?—That is so. I think all these are factors in this, although one cannot say definitely the precise part they play in producing a higher death rate.

4284. There is a striking difference when shown by the figures in this way?—Yes.

4285. And the ratio of permanent diseases remains almost constant—not quite?—No, it is increasing.

4286. But it is pretty much the same in both sexes?—It is uniformly greater in males after age 45.

4287. There is another thing it shows, and that is this, that the ratio of phthisis in men is not different from the ratio of phthisis in women?—Not greatly, save after the age period just referred to.

4288. If you have phthisis due to industrial diseases, wouldn't you expect to see the black marks on the tables going very much higher?—Yes.

4289. But you do not see that?—The rate is greater, however. (See Table II.).

4290-1. Another point occurs to one, and that is that if there was a large portion of the female population engaged in industry, a large amount of the phthisis produced by industry would be found in females?—It might in particular industries, but save

in the age periods already alluded to the phthisis rate for women is lower than for men.

4292. Is there a large number of girls engaged in factory work?—Yes.

4293. But are they engaged under conditions in which their work is likely to give them phthisis—are they engaged in dusty occupations?—Well, I do not think we have any evidence that industrial diseases form an appreciable portion in the death rates of females; it never occurs to one that you can definitely trace the effect of industry in individual cases among them as you can do in males.

4294. Will you please explain to us the other table you have produced?—It is a table of comparative mortality figures.

4295. This is of males?—Yes, it is constructed on the census returns of the males engaged in various occupations, and the deaths occurring among them.

4296. Is this the general death rate?—It is a comparative mortality rate for ages 25 to 65.

4297. The death rate from all causes?—Yes, from twenty-five up to sixty-five. After taking the standard population the death rate for individual occupations was applied to the group, and then the standard figure got, and it indicates that the worst of all is the group of "labourers." There is this to be said in explanation of the somewhat high figure (2,032, as compared with 1,000 for "all males") here showing that it is obtained from our "corrected" deaths. We have a system of tabulating deaths in Glasgow after a local inquiry—a visit to the house, and certain information got—and when I began to consider this I discovered that we have been in the habit of entering a man's occupation if he was a labourer, simply as such, without discriminating between the different kinds, *i.e.*, paying no heed to whether he was employed at the docks or in a foundry, or warehouse or elsewhere, and every kind of labourer is here grouped together.

4298. Is that due to the fact that perhaps people of poor constitution would take up the poorer paid occupations that would be considered general and undefined?—Partly that; and I may mention that in the case of those forming this group you have a good deal of drinking and irregular employment.

4299. It would be put down rather to the physique of the men and their habits than to the nature of the employment. Would you say this was a more dangerous employment than brick and cement making?—No, but rather this, that the workers drift into it from their physique and inefficiency.

4300. That is, that it is not due so much to the nature of the employment as to the nature of the men?—Probably to the character of the men; but I take it that the inefficient men drift into it.

4301. In other words, if you had men of such physique as are employed in some other employment and then put them here, you would find that the number would go down?—Yes.

4302. It is not the nature of the work they do so much as the habits of the man?—I think so.

4303. So there is not much to be got out of that figure so far as industrial occupation is concerned?—That is so; but the unskilled labourer is irregular in his employment, and that tends to other irregularities, the result of which is shown in the figure here given.

4304. You would probably be able to say that brick-making was not such a healthy employment as some of the others?—Yes; the comparative mortality figure for them is 1,332, and their death rates at the four age periods are 13, 18, 44, and 42 as against 8, 14, 25, and 47. (See Table VII. Appendix.)

4305. Have you the phthisis figures?—Yes.

4306. Would not it be rather valuable to have the phthisis figures shown here—the phthisis figures out of the employment?—Yes. They are in Table VIII., and show rates of 3·5, 5·09, 16·3, and 3·5 per 1,000, against 2·6, 3·4, 3·8, and 2·6 for corresponding ages of "all males."

4308. But could you say straight off from memory that in any one of those occupations you have put down there is an abnormally high phthisis figure?—On page 6 of the first statement (now Table VIII. Appendix) I have produced the death rate for phthisis for several occupations.

4309. Which is the worst?—The textiles, and brick and cement workers.

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4310. Is not the figure for general and undefined workers the highest?—Yes; but I have explained how this figure was obtained in dealing with this group.

4311. That probably is due to exposure to bad weather, exposure to wet?—Well, that is one cause, exposure to all the causes we were discussing in connection with this table of mortality figures for several groups of occupations.

4312. (*Dr. Legge.*) Isn't it the same there, too, that in that class also it is much the higher?—Yes, it is much the higher.

4313. (*Chairman.*) The brick and cement workers seem the worst; at twenty-five years of age, the figures are not large, but when you get to forty-five years of age, the figures are very high?—Of course there is to be kept in recollection that the total figures dealt with in that particular group are not very large.

4314. But still, look how it rises, at twenty-five it is three, at thirty-five it rises to five, and at forty-five it becomes sixteen?—Yes, that is true.

4315. It looks as if in the brick and cement trade there was some form of phthisis which began to develop about forty years of age?—Yes, if the figures were established in other observations.

4316. Have you of late shown any distinction between fibroid phthisis and ordinary phthisis?—That does not appear in the Registrar's returns, and it does not appear, so far as I can make out in the deaths returned, in any of the large infirmaries in Glasgow.

4317. Have you any materials from which you can give us an idea of the proportion of ordinary phthisis as compared with fibroid phthisis in these trades?—No, we have no figures that would illuminate that phase of it at all. You see I must deal wholly with the causes as registered, I have no means of getting behind that.

(*Chairman.*) It looks queer that this figure, viz., sixteen, comes in at the very critical period of forty years of age.

(*Professor Allbutt.*) It would be better to ask Professor Muir about that; he would be able to go into the detail of the subject better, because, as Dr. Chalmers says, he himself does not get behind the Registrar's returns.

4318. (*Chairman.*) What are the chief trades of Glasgow, as regards numbers employed, what are the staple trades?—Quoting from the Registrar-General's enumeration of occupations, I imagine the group of metal workers generally.

4319. What sort of metal working will that be?—Well, it includes pig iron manufacture and steel smelting.

4320. Are there any particular industrial diseases characteristic of that pig iron industry?—So far as there is any evidence, I take it that that comparative mortality figure for the metal workers indicates that they are rather better than the all-male average.

4321. There are no very alarming figures as to the industrial diseases in the case of those men?—No, they have a lower death rate than all males, and a lower phthisis rate, and a lower rate in other respiratory diseases.

4322. And that may be considered distinctly satisfactory?—I think so.

4323. What is the next employment in males, apart from crude metal making?—Well, it includes iron foundries and brass foundries.

4324. Have you got brass casting, is there a good lot of them here?—I am endeavouring to read that into the figures here, but I do not think it is possible. I really do not know.

4325. Have you reason to think there is any great mortality or disease amongst brass foundries?—I am not aware.

4326. Is there metal grinding to any extent done—metal grinding and polishing?—No.

4327. Agricultural instrument making?—There is no agricultural instrument making, but there must be certain polishing. I have seen polishing occasionally.

4328. Not very much, not as much as in Birmingham?—No.

4329. Do you make bicycles here to any extent?—Yes, but to what extent I do not know.

4330. There will be metal grinding and polishing?—Yes, I imagine that there must be a good deal of metal polishing in several industries, but I have not seen much.

4331. Does that exhaust the divisions of the metal trade in Glasgow?—Yes, it practically does; of course, engineering and blacksmith workers are also included.

4332. But they are rather healthy trades?—Yes, they are included, however, in that one group.

4333. The next is the textiles?—Yes.

4334. Is there any ground for thinking that there is phthisis amongst textile workers here to an abnormal extent; in Table VIII. you get rather higher figures, 5.9, and when you get over forty-five years of age the phthisis increases rather?—The death rate for textiles is higher at each age period.

4335. And in the later periods it is particularly higher from phthisis?—Yes, it is much above the average; at sixty-five it is 5, as compared with 2—that is twice the rate of all males.

4336. Does that lead one to think that there are some industrial causes at work in producing that higher phthisis death rate amongst textile workers over forty years of age?—Yes, that is so.

4337. The phthisis in the earlier age is not abnormal in textile workers?—Yes, it is 3.6 against 2.6 at twenty-five.

4338. Then, it becomes higher still?—Yes, 5.7 against 3.4 at the age of thirty-five. It is still 5.9 against 3.8 at forty-five.

4339. Would you call these rather alarming figures or not very alarming?—Well, these are in excess of the average population, and in excess of the average even for males at these ages, but I do not think they are nearly so excessive as will be found in other industrial places.

4340. Do you put that down to their breathing dust or dampness; is there much humid cotton spinning?—No, but whether it is present or not I am not quite aware.

4341. Can you give us the principal textile industries?—Not in any detail.

4342. Is there any flax here?—Only twenty-two people are employed in connection with flax altogether. There is a certain number employed in connection with wool and worsted—about 300. There is a small number employed in connection with silk, hemp, and jute. They are all relatively small, the total being 9,000 altogether.

4343. There is nothing to show that phthisis is specially met with in carding, for instance?—No, the number is so small—only about eight.

4344. Then, if carding was dangerous, it would be a very small proportion of the whole?—Yes.

4345. Then, I may take it generally that the views you have been able to form from these statistics you have collected are, that the industrial conditions of Glasgow seem upon the whole to be good as compared generally with the country?—Yes, that is the impression one forms, if there is any excessive predisposition to particular diseases it does not appear certainly here.

4346. There is no special industrial disease that marks it out clearly as very noteworthy apparently?—No, there is no special disease that comes to the surface in handling the returns of deaths.

4347. There is no disease that appears striking, and that would make one say, "This is a blot on Glasgow"?—That is so, that is quite the impression one gets from these figures.

4348. (*Professor Allbutt.*) The only thing I had in my mind to ask was about the general undefined workers—are the docks included in the city?—Yes.

4349. Are there a large number of dock labourers?—There are 2,800 dock labourers.

4350. Is that a relatively large number?—There are 38,000 persons in that group in which they are included, which is "conveyance."

4351. Then it is rather a small number?—Yes.

4352. Have you any knowledge as to the prevalence of heart disease among the dock labourers, or men employed in portage?—No.

4353. (*Dr. Legge.*) Are these figures you have prepared for us got out from certified copies of the death

certificates of the Registrars?—These two dealing with the death rates from 1870 are from the Registrar-General's deaths uncorrected. On the other hand, the figures on which the comparative mortality figure is based and these tables which are in the statement I have produced are quoted from my corrected information.

4354. But it is from these certified copies of the death certificates you get the occupation?—Yes.

4355. Do you have to pay the Registrar for that information?—Yes, twopence per copy. In addition to the information we have from the Registrar, there has been a card system of recording the deaths in Glasgow for quite thirty years.

4356. An ordinary Medical Officer of Health does not necessarily get the information as to the occupations?—No.

4357. You have a number of chemical workers in Glasgow?—Yes.

Professor JOHN GLAISTER, M.D., called and Examined.

4364. (Chairman.) You are a Doctor of Medicine of the University of Glasgow; a Fellow of the Faculty of Physicians and Surgeons of Glasgow, of which at present you are Vice-President; a Licentiate of the Royal College of Physicians, and a Licentiate of the Royal College of Surgeons, both of Edinburgh; a Diplomate in Public Health of the University of Cambridge; a Fellow of the Royal Society of Edinburgh; a Fellow of the Chemical Society; a Fellow of the Royal Sanitary Institute; and a Fellow of the Royal Institute of Public Health?—Yes.

4365. You are Regius Professor of Forensic Medicine and Public Health in the University of Glasgow?—Yes.

4366. You have been in practice in Glasgow for thirty years?—Yes.

4367. And during that time you have had an opportunity of taking an interest in and observing diseases of trades and occupations?—Yes, I have been much interested in them all the time.

4368. And during twenty of these years you were resident at St. Rollox, a district of Glasgow?—Yes.

4369. In which there are several trades carried on?—That is so.

4370. I think you have written some text books, in which these subjects are more or less dealt with?—Yes, that is so.

4371. And you are able to give us evidence upon the effects of the following substances on health, namely, bleaching powder, chrome, and potters' disease—from the dust, I suppose, known as potters' rot?—Yes.

4372. Ammonium chloride, carbon monoxide, and naphtha?—Yes.

4373. We may take them in that order, so as not to get them confused one with another?—Yes.

4373*. Will you first give us any observations you have to make upon sulphuric acid and bleaching powder; you might take these together?—Yes, sulphur fumes and bleaching powder.

4374. Or do you prefer to take them separately?—They ought to be quite separate, because the one is chlorine and the other is sulphurous acid practically.

4375. We will take them in order; take sulphurous acid?—Sulphuric acid is not an irritant unless it is the strong sulphuric acid. It is the sulphurous acid that is the most irritant. Sulphurous acid has the chemical formula of SO_2 , one molecule of sulphur with two molecules of oxygen. SO_2 is obtained by burning sulphur, and the fumes which form are those which are given off from the burning of a sulphur match. The old sulphur matches will be remembered; the pungent odour that is given off from the burning of an old sulphur match is sulphurous acid, and that gives rise to the irritation of the respiratory passages.

4375*. What are the effects of that irritation; in all the effects you are going to give us you will kindly distinguish between the immediate effects and the permanent effects?—Yes.

4376. Because I would like to explain that they may be considered in the one case as of the nature of an

4358. Alkali works?—Yes.

4359. Employing some thousands of male workers?—I could not offer any opinion as to the numbers they employ.

4360. Do you include Rutherglen?—No.

4361. What would you say about chemical workers in this comparative table of figures?—Chemical workers are few.

4362. The deaths of chemical workers are few?—I mean the number; there are 3,000 persons engaged in chemical works, soap works, saltmakers' works, and manufacturing chemists—there are not many altogether.

4363. Your attention has not been called to any particular diseases on the death certificates of chemical workers?—No, not in connection with the chemical workers here.

accident, and in the other as a poison or disease; you will distinguish between the sudden effects and the chronic results?—Yes, I happen to know about the chronic effects, because while I was in that district men employed in these works required to be put on the society for illness allowance, and the illness from which they suffered was periodical more or less every winter. I may explain that I was associated with some of these works as medical officer, and I was interested medically over and above that.

4377. How many years ago?—About fifteen or eighteen years ago. The chronic effect of sulphurous acid was to produce chronic bronchitis, beginning first of all as a winter cough. The earliest manifestation of the symptoms was a winter cough, which usually repeated itself each winter, gradually gaining in severity, until eventually the persons were almost never without a cough and difficulty in breathing. The men became prematurely old, and were unfit for work by the time they reached about fifty years of age. These were the effects of sulphurous acid—chronic effects.

4378. Was that aggravated in any way by intemperate habits on the part of these men?—Undoubtedly.

4379. And perhaps their intemperate habits were, to a certain extent, brought on by the irritation?—Well, sometimes the depressing character of their occupation compelled them to take stimulants.

4380. When you speak of the depressing character, do you mean depression was produced by the chemical itself, or by the feeling that they were getting ill?—The feeling that they were getting ill. It is a curious thing with regard to certain of these gaseous materials that they produce a dispiriting effect on the persons exposed to them, and these persons are liable to take stimulants to overcome this, as they think, which habits are inclined to gain on them, and they become intemperate.

4380*. They drink more?—They drink more than they intend.

4381. They drink more than the ordinary workmen drink?—Yes.

4382. Was this bronchitis distinguishable in its character from the bronchitis that an ordinary man might get in any occupation?—I do not think so.

4383. Clinically it is indistinguishable?—That is so. This bronchitis is noticed by a series of effects, and when it is chronic it leads to an inflammatory condition of the bronchial tubes, and when the man goes to the physician it is impossible for him to say whether it is caused by sulphurous acid, or hydrochloric acid, or is an ordinary inflammatory condition; it is simply the presence of the irritating gas.

4384. The only reason you concluded this must be the cause was because rather an abnormal number of these men were attacked; there was more of the bronchitis about than there ought to be?—Yes, and I can speak from personal experience. I visited these places in order to see what the atmosphere was like, and I could not have stood in the atmosphere for two minutes. A fit of coughing was brought on by reason of the acid, and I had to clear out.

4385. Have you seen the works lately?—No, not since

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twelve years ago—not this particular work. I have seen some works since, but not this particular kind of work.

4386. You are not aware whether they have been putting in fans and ventilators?—No, but if they have that would very much improve the conditions.

4387. (*Professor Allbutt.*) I suppose you could not form any approximate notion of the degree of it; would it affect 60 or 70 per cent. of the men?—I would say that practically 70 per cent. would be more or less affected, and of that 70 per cent. possibly a third would be much more affected by reason of their habits than the rest of the men were—the men who were reasonably careful of themselves. These men would be disabled by the time they got to fifty-five or sixty years of age—disabled from any employment.

4388. There is nothing like a definite immunity to be established?—There cannot be, because of the constant exposure; it is a question of a delicate mucous membrane being exposed to constant shocks.

4389. Are the atmospheric conditions bad?—No, I do not think it is that, but if there was more draught there would be less mischief from the cause.

4390. Supposing we had to regard these men as in some degree the victims of alcohol, apart from the sulphurous acid, should we not rather expect the alcohol to injure them in a different way?—Alcohol would not affect them from the point of view of bronchitis at all, except they were in the habit of living out at night after a drinking bout, when they might contract cold, but that is comparatively uncommon. I was police surgeon in the same neighbourhood for twenty years and I have a fairly good knowledge of the habits of that class in that district, and I can say they were not in the habit of sleeping out at night. Alcohol would be an aggravating cause in so far as it would induce bronchitis.

4391. Does it produce dilation of the bronchial tubes?—Yes, possibly congestion of the lungs, enlargement of the right heart, and eventually failure of the heart's action.

4392. Is there much fibrosis?—No, not in that condition. There is not so much mischief in the lungs themselves to cause fibrosis.

4393. In what industry do you find this sulphurous acid?—In making sulphuric acid.

4394. The roasting of the pyrites?—Making the sulphuric acid by the burning of the sulphur.

4395. (*Chairman.*) Now, we will pass to the making of bleaching powder?—Well, the conditions, of course, in bleaching powder are practically identical with those in the making of sulphurous acid. The chlorine and the hydrochloric acid fumes are most irritating. I believe, if anything, chlorine is much more irritating than sulphurous acid, and it has a strong effect on the teeth of the men. The effect is very rapid. In that work I have in my mind, the teeth of the men were rapidly affected by the chlorine, and they had the lung symptoms coming on in the same sequence and order and circumstances as in the case of sulphurous acid.

4396. What did that bring on principally?—Bronchitis.

4397. And the remarks you have made with regard to bronchitis in the case of sulphurous acid would apply to chlorine?—Yes.

4398. Is alcohol used as a cure to a man overcome with chlorine fumes?—Oh, yes, there are some remarkable cures among these men. There used to be a very common cure; if a man got "gassed" they very often stuck him down on his face, so that he was supposed to inhale the air from the ground, which was supposed to cure him, and they always applied the alcohol because it was a natural cure for any kind of sickness.

4399. Can you say that about the same number were affected—60 or 70 per cent.?—About the same approximately, so far as my observations have gone.

4400. (*Professor Allbutt.*) And the ultimate pathological results were precisely the same?—Yes.

4401. (*Dr. Legge.*) Would you describe the way in which the teeth got affected?—My impression is that the teeth got affected simply by the absorption of hydrochloric acid fumes in the mouth during the working. The chlorine fumes become dissolved in the saliva; they become acid in consequence, and very often these men wore a cloth, and that, I think, parti-

cularly with the acid character of the saliva attacked the dentine.

4402. In explosive factories in which there are nitrous fumes the teeth get affected just in proportion as the mouth is opened during speaking or breathing, and the incisors get eaten away?—I could not say, from my observations, how much that applies merely to incisors; that is what makes me think it is the saliva more than anything else.

4403. Does that produce pain?—They have to get them taken out, they go to the surgeon.

4404. It leads to incapacity for work?—No, the man gets his teeth pulled and goes back the same day to work. There was an old surgeon there to a chemical work for twenty-five years, whose work I did when he was ill, and he had a very rough and ready method of pulling these men's teeth. They were big tall men, and they came regularly every morning—a dozen or two—to get a tooth pulled.

4405. Are the majority of these men toothless?—A great many are without teeth.

4406. At what age?—By the time a man has been half a dozen years in a chemical factory of that kind he has lost, I should think, double that number of teeth, or they have become much diseased.

4407. Do you know of any other industry where the teeth get affected in the same proportion in that way, or in any other way?—In mercury works you get the loss of teeth from another cause.

4408. But you do not get it from sulphurous acid?—I have not noticed it so much from sulphurous acid, because sulphurous acid is not nearly so corrosive as hydrochloric. If you mix sulphurous acid with water it does not form the corrosive fluid that hydrochloric acid forms when dissolved. I have tried to reason it out in this way, that it was by reason of the great increase of corrosive matter in hydrochloric acid.

4409. And it is an inevitable result?—In my experience, I have attributed it solely to that.

4410. (*Chairman.*) We will pass from that now to the chrome?—Yes, there was only one chrome work in the neighbourhood, and I had the opportunity of observing some of the men, and my impression from observation of these people was that several men—I cannot say how many, because I had not personal charge of them all—suffered from erosion of the nasal septum, and suffered from perforation. Most of them during the time they were there were liable to have chrome holes in their fingers. If they had the least ulceration, or any accidental wounds, these chrome holes formed deeply, and almost bared the bone. The men were inclined to attribute both of these things, the perforation and the chrome holes, to the inhaling of the chrome acid or the bichromate potash powder into the nostrils, and to the handling of the powder or the acid by the hands, and the material in which they worked.

4411. It was mostly in dyeing black that that chrome was used?—This was simply a manufacture of bichromate of potash, it was making the material itself before distribution.

4412. Does that produce a permanent illness—these chrome erosions—or does it cure again?—It cures; you get it commonly among men working who have had their chrome holes and have gone back to work shortly afterwards. It incapacitates them merely for a short time. It may keep them off for a few weeks, but not for any length of time, and I personally have not seen any constitutional effects from working in chrome factories.

4413. We have had the same effects elsewhere, we have heard about dye works where they have been using chrome?—Yes.

4414. (*Dr. Legge.*) Do you know the principal works where the bichromate is made?—No, it is on the south side of the river; it is very much the largest one.

4415. Do you remember the duration of the illness these chrome holes on the fingers entailed?—I have had them under care for three or four weeks.

4416. It is very intractable?—Difficult to heal.

4417. And the perforation of the septum?—It varies.

4418. Does that lead to abstention from work at all in your experience?—Well, I advised the men to abstain from work during the process—while the material forming the perforation was gradually being removed, just to prevent repeated sources of irritation.

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4419. Have you any knowledge of anything that would prevent that?—No, except plugging the nostrils with cotton wadding, but I would hardly expect the workmen to do that, according to my experience.

4420. Periodical examination of the workers would make chrome holes tractable?—Yes, I think, if there was periodical medical inspection of such works as chrome works you could very materially limit the mischief therefrom.

4421. Do you think there is much danger of malingering from this perforation of the septum, that a man might say he was unfitted for work because this ulceration was going on inside his septum?—I think a man with medical experience would be able to say with regard to any ordinary man whether he was malingering or not. There would no doubt be cases of attempted malingering.

4422. But at present, while this process of ulceration is going on it does not lead to necessary abstention from work?—No.

4423. Have you ever known men who had perforation of the septum of the nose without knowing that they had it?—No, I think the men all know. I have some statistics here which the Committee might like to have in regard to chrome. They are not my own, but I thought they would be of assistance to the Committee. They are observations made on 257 persons working in chrome works.

4424. When were they made?—In 1901.

4424*. And by whom?—Hermann of Germany.

4425. Are these to be found in some German publication?—In a German journal. I thought you might want them if you have not got them.

4426. You might state the general effect?—They are very short, and I can read them. Hermann affirms that chronic acid and the chromates exercise prejudicial action both directly and indirectly; directly, by producing nose and skin lesions, and indirectly, by causing lesions or affections of stomach, respiratory tract, and kidneys. Of seventy-seven workers employed for not longer than one month thirty-four remained healthy, thirty-two had nasal abscess, and only one perforation. Of thirty-nine who had worked longer than three and less than six months, two were healthy, fourteen had abscess, and twenty-three perforation. Of thirty-one who had worked for more than a year none were healthy, seven had abscess, and twenty-four had perforation.

4427. What is the general conclusion to be drawn?—From these figures it would appear that six months' employment in a chrome work is likely to lead to nasal septum perforation in the bulk of those employed.

4428. That would be very easy to verify by going to chrome works; you could see whether our experience is the same as that of the Germans?—Yes, that could be easily done if you could get all the men who had been six months in the employment and compared them with those who had not been so long.

4429. You do not know whether these men who have perforation do, as a matter of fact, absent themselves from work?—I cannot say further than this, that when men came to me with perforation I said they must abstain from work, for if they went to work they exposed their already tender mucous membrane to further irritation by this mischief, and that they would do well to abstain for a while.

4430. In your opinion this could be prevented by plugging the nostrils with cotton wool?—Yes, very largely, just as in certain other occupations you can largely prevent the necessary deafness that follows by wearing air plugs.

4430*. If the Workmen's Compensation Act contained a provision that workmen who brought on the disease by wilfully neglecting some precautions would lose their compensation, it might become a question here whether it would not be the men's own fault if they got this disease—if they neglected the precaution of plugging their noses with wool?—I am perfectly certain it is due to their own fault; judging from my experience and observation in these works I am bound to say I have no high conception of the care these men exercise with regard to the condition of their bodies. In connection with a pottery where I was asked by the employers to take care of the health of their workmen from all points of view, I discovered an outbreak of lead poisoning in the work,

and I said you must do so-and-so and so-and-so—directed practically all the conditions laid down.

4431. You might mention these?—I said to the employers, "You must provide wash-hand basins, overalls, soap, and towels for all the men employed in the dipping establishment; you must provide lemonade—that is, sulphuric acid and water, and in the wash place you must have nail brushes, and prohibit any men from taking their food inside."

4432. This was fifteen years ago?—Yes, fifteen or twenty years ago, before these things were required by special rule. I did that, and the workmen enthusiastically did it for a fortnight, and then "chucked" the whole thing aside and paid no more attention.

4433. (Chairman.) We will pass now to potters' rot; again you are giving us the experience of some years ago?—Yes.

4434. It is well we should distinguish it, because so much has been done since then?—That I understand. Well, I was going to say that even in the case of potters I could not say that the mischief, so far as the lung conditions are concerned—that even at the same time of which I am speaking there was as much mischief done in the potters' work with which I was familiar as there was in the chemical works. I came across fewer cases of chronic fibroid phthisis in the potters' work than I found of chronic bronchitis in the chemical works, where there was sulphurous acid and hydrochloric acid.

4435. You call it fibroid phthisis?—Yes.

4436. Was that potters' rot thoroughly distinguishable from tuberculous phthisis?—Yes, I would say it is distinctly so. I did not find the prevalence of the lung conditions so great in potters' mischief as I did in chemical mischief.

4437. That is, that the lungs, in whatever way they were affected, were not affected so much?—I mean that.

4438. You say it is quite easy to distinguish between fibroid phthisis and tuberculous phthisis?—Yes, I was going to say that I have only once or twice seen acute grinders' rot, such as in steel grinders for instance. There is acute steel grinders' rot, and in the chronic form of it it usually takes the fibroid character—a slow gradually forming congestion of the lung in its upper part, with dilated bronchial tubes, and sometimes large sputa in the morning.

4439. But could you distinguish that as a medical man called in, supposing you did not know the occupation that a man had been engaged in?—I could say this, that the chances were the man had been employed in some occupation where there was some foreign material inhaled during the process of his employment, but I could not descant on his employment.

4440. But you can tell the difference in the early stages between fibroid phthisis and tuberculous phthisis?—No, not in the early stages; it must have become distinctly chronic before we can distinguish, because in the early stages the symptoms are precisely like those of tuberculous manifestation.

4441. What is the first symptom that begins to differentiate the disease?—You get some degree of consolidation, not so marked as in tubercular disease. You get it by percussion—by sound. You can detect it as a dulness in tone; the breathing becomes more and more tubular—more tubular than vesicular. There is a wheezing, moist sound inside the lung that should not be there, showing that there is some irritation or mischief.

4442. To put the question from another point of view, supposing the third schedule of the Act of Parliament provided that fibroid phthisis cases should be compensated, but not tubercular cases, would there be a very great difficulty in administering that—in medical men being able to distinguish between a potter who had got common consumption from some other cause not connected with his work and a potter who had got fibroid phthisis?—Clinically there might; there would be none, provided an examination of the sputum for tubercle bacillus was made.

4443. You could be sure then?—Yes, you could examine the sputum for the presence or absence of the bacillus.

4444. But could you not have a combination of the tuberculous phthisis and fibroid phthisis; might not fibroid phthisis have superimposed upon it tuberculous phthisis; you get the tuberculous and yet it would be caused after all by potters' rot?—Yes, but you are not

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likely to get tubercular mischief starting so readily in an elderly person as in a young person. That is, the immunity to phthisis increases as age advances, and when you get to forty-five or fifty years of age, when this thing begins to show any alteration, men are getting more and more out of the reach of phthisis, and more into fibroid mischief, and then your clinical test as to the presence or absence of bacillus would make it clear.

4445. Then, according to you, difficulty of administration ought not to stand in the way of classifying fibroid phthisis as a thing that should be compensated for, and diagnosed with a fair degree of certainty?—No, I would not say. The question of administration is a very particular thing, but I say if it could be worked.

4446. Would you undertake, as a medical man, to say that you should be able in any particular works to pick out the men who were affected by fibroid phthisis and put them aside for compensation, and that you should be able to pick out the others who ought not to be considered as having phthisis through their occupation?—I would go the length of saying that in these days when diagnosis of lung conditions by examination of the sputum of bacilli is so common and so relatively easy, that there is less difficulty now in diagnosing than there was ten years ago.

4447. But would there be an insuperable difficulty at present, would it be very difficult at present to do that—to tell whether in the case of any particular man, with a reasonable degree of certainty, he caught his phthisis through his occupation or from some other cause?—I should say there should be no reasonable difficulty when you come to a man of forty-five years of age to say that that man probably took his disease from the fact of his occupation.

4448. At earlier ages there would be difficulty?—Yes, there might be more difficulty, but when you come to forty-five years of age there should be no reasonable difficulty in applying these tests.

4449. Particularly if you had an appeal from a medical certifying surgeon to a special surgeon in cases of difficulty?—Yes. I am bound to say that I think many medical men who do not now cultivate methods of bacteriological work would readily do it if they had to do it.

4450. And you mean that the necessity of administering a provision like this would call into play greater care and observation, and make it easier and easier to deal with reasonable fairness as between masters and men?—Yes, I think an Act like this would go a considerable way in making these medical men compulsorily familiar with the work they had to do.

4451. I suppose you are not able to say whether potters' rot is on the decrease or not since the days you saw these men?—No, I cannot speak of it; of course, I know what has been done as regards ventilation, and I should say, looking to these statistics to-day that it seems to be on the decrease, as it is bound to be with ventilation conditions improved.

4452. (Professor Allbutt.) Do you think it probable that in the large majority of cases, even where tubercle may have become a considerable secondary feature in the case, that a distinction may still be made between cases originally due to this bacillus and cases primarily fibroid, and this of some standing?—I believe in ordinary well-observed cases that would not be difficult.

4453. I am assuming we have all the facts we want?—Well, assuming that, it should not be difficult. I would say this, that where a man has turned ill in a work, and where it is a question of interest to him whether he has got fibroid phthisis or not, naturally the medical man would be asked to examine his sputum, and there would therefore be instituted a point of time when examination would or would not reveal the presence of tubercular bacillus.

4454. I should like to put it even in a little more searching way still. Let us assume that there may have been an insensible reception of the tubercle bacillus at some comparatively early stage, which would have gradually modified the course of the fibroid phthisis?—Would it not then become a question of argument whether you may be dealing with a case of chronic tubercular phthisis?

4455-6. My point was—here is a case: A is sent in to be examined. Query: Is his case one of fibroid phthisis or a case of tuberculous phthisis, or, again, a case of fibroid phthisis plus the tuberculous bacillus?

I think, from examining thirty men, our impression was that we could have made that diagnosis?—I am not gainsaying the fact, and I am wanting to agree with you, but I want to make my answer clear in this way, that if it were put down in the Act that fibroid phthisis would be subject to compensation, then undoubtedly whenever a case arose after the Act was passed, and that condition was laid down, you would institute very many new rules for the observation of these cases, and you would get new data, which would at once clarify the situation. The men would say, "You must examine my sputum."

4457. I think we cannot depend upon any one element by itself. Supposing a case came under controversy, I think our wider judgment must not be over-riden by a mere examination of the sputum?—My difficulty is that if you are going to give such a case compensation, unless it has been a chronic one, and the tubercular does not seem to be a very great element in the case, you would have difficulty in distinguishing in that case between one and another. There are slow tubercular cases from the very commencement. If you have a case with a chronic lung condition not advancing far, with the tubercular bacillus not making much difference on the progress of the case, then I think you would be warranted in thinking it was an original fibroid case.

4458. Yet I am more disposed to rely upon a broad view of the whole clinical history and conditions than upon any one co-efficient?—Yes, I agree.

4459-60. The next point is this: Grinders have to handle rather large objects; is there anything in the attitude of a grinder at work which would interfere with the full expansion of his lungs?—Yes, in my opinion the muscular strain involved in holding the article to be ground against the place of grinding compels a rigidity of the muscles of the chest, and of the chest walls, and impairs the respiratory functions.

4461. So that the discovery of impaired respiration in a large number of those men does not at all necessarily prove what is suggested, that they have a certain incipient degree of fibrosis?—No. If I had these men before me the test I would apply in order to satisfy myself whether there was really deficiency of lung volume or power would be to put them on the spirometer.

4462. But that also is a matter of practice very much?—Not at all; you can test the ordinary person by applying the spirometer, and if you took thirty of them you would find the average very quickly. If you took thirty of any other ordinary occupation and tried the average where there was the same cramped attitude, it would give the keynote of the situation.

4463. I have tried the spirometer in brass workers, but I could not satisfy myself as to its usefulness, but of course there was not the same difference there as there would be with fibrosis of the lung?—No.

4464. We might have a considerable lower average?—That is all I am asking you to get; compare thirty average men at dry steel grinding with thirty men who are working at an occupation where the action of the chest wall is untrammelled and you will see a difference, even in practised men.

4465. That would only go to prove your point of the rigidity of the chest?—Yes.

4466. But it would not satisfy us whether their respiratory capacity was less?—Would it not? Supposing you find thirty men had a large respiratory capacity—total volume capacity.

4467. That might be due to their chest walls being so fixed that they could not expand them?—Yes, but would not that lower their total capacity, and would that total lowered capacity not tend to render it more vulnerable to inhalation of dry steel particles?

4468. Yes, that is another point?—Yes, there are two points involved.

4469. The next point is this, that in some of those men the breathing was altered in quality; it was distinctly harsh, there was prolonged expiration, and in some, very few, there was an occasional wheeze; putting these three together, you would say there was, however incipient, fibrosis?—Yes.

4470. But before you got these changes it might be mere chest fixture?—Yes, undoubtedly these three signs indicated the primary stage leading on to something more.

4471. May we ask you this further question—though it is a very difficult one to answer—supposing that a

man had got so far that there was something morbid about the respiration, and a certain harshness, do you think if that man were taken off that work entirely and put—let us say—on the land, that he would recover?—Well, you indicated that it is very difficult, and I agree, but I have no doubt it can be answered generally in this way, that there are certain cases in which, if you removed men from a circumscribed environment of work and put them on the land, they will improve almost from anything.

4472. I was thinking of the man's lungs particularly?—I am speaking of that; I have it in my mind; he will recover from almost any condition of his lungs, because that is what we are doing for phthisis nowadays. We give the patients lots of fresh air, and give them some movement, increase of tonic action, and they improve.

4473. It would be a very fair forecast that the man would improve?—Yes, there is a reasonable chance of his improvement.

4474. We want something more than a reasonable chance?—Yes, in order to give a better answer than that one would require to know more in the way of the question; it has to be indefinite, but put it in this way: If I got a man in the state described to me with a want of lung movement, a harshness of breathing, a few dry râles, and a generally lowered tone of breathing, the case would likely be improved by putting him on the land.

4475. (Dr. Legge.) Perhaps you would not like to say whether, in your opinion, fibrosis of the lungs, apart from tubercle, is necessarily fatal, or must, apart from tubercle, be necessarily fatal?—I have seen cases of pure fibrosis where there has been no tubercle. I examined by *post-mortem* the body of a man on Monday, where the cause of death was another cause altogether, but where there was marked fibrosis at the apex of his left lung, and considerable fibrosis of the upper portion of his right lung. That man must have been employed at one time or other in one or other of the works in Glasgow where gritty material had been in use. I could find that from my knife. I could find out, I think, where the man had been employed. I have seen many cases at *post-mortem* examinations where there was fibroid phthisis, and there has been no tubercular evidence of any sort.

4476. On that point you are quite certain?—Yes. I have not yet mentioned that I am Medical Legal Examiner to the Crown in Glasgow. I make all *post-mortem* examinations in connection with sudden deaths and criminal deaths of all sorts, and I have to handle a great many bodies in that *post-mortem* work, and I have seen what I have indicated—pure fibroid cases without tubercular.

4477. I would like you to distinguish between the old fibrosis of years' standing and one that was still in an early stage?—I cannot say I have seen cases; I do not think the case on Monday was one which would be described as in an early stage; the fibrous tissue was there.

4478. But it was progressive?—It might be progressive, but certainly the apex of the left lung was practically all fibrous tissue together, and there was no tubercular at all.

4479. (Chairman.) You mean gritty—was that due to particles of steel?—I think it was silicious matter; it might be sandstone, for all I know, he might have been a mason.

4480. The microscope could have determined that?—Yes. The man happened to die from meningitis, and I was not concerned with whether it was due to one cause or the other.

4481. We have been told that a man may work in a dangerously gritty atmosphere for a great many years, and that as a rule the effects of such an atmosphere do not become serious till he approaches forty years of age; would you agree with that?—I would make a different statement altogether from that; my point is that it depends entirely on the habits of the man with regard to his breathing. If a man breathes through his nostrils that delays for a great many years the mischief of inhalation. If he breathes through his mouth then he gets directly into his lungs more rapidly the objectionable material. My impression is that it depends more on the habits of breathing than on the age, and of course there are hereditary tendencies on the part of people to take lung diseases at earlier ages than others, but I do not think the fixed age of forty is of much

moment, and I am saying that because I recollect a year I spent among miners thirty-one years ago. I found there that it did not depend on the age when a man became attacked; some were attacked earlier, and some were never attacked at all.

4482. Was that rock dust?—No, ordinary coal-mining dust.

4483. Is it your opinion that coal dust may cause fibroid phthisis?—No, but it may produce bronchitis; I never saw a case of fibroid phthisis from coal dust.

4484. An instance was given us by a workmen's doctor who had been a good deal among the men, and he said that as a general rule a man did not begin to show fibroid phthisis to a dangerous extent till he was approaching thirty; they would work for twenty years in the pit with a certain amount of illness during the twenty years, but if they got fibroid phthisis the time it generally developed itself was when they were approaching the age of forty?—I could agree with that generally in principle, it might be a suitable age to label it at forty. Forty to forty-five, I think, is the telling age of a workman's life.

4485. We asked this question, if a man at the age of forty, when he was beginning to be attacked, had his occupation completely changed, would he be fit for anything still for the rest of his life, and the answer we got was yes, he was inclined to think so, that if the man was taken away on the first outbreak of it at about thirty-six years of age, and his occupation completely changed, he should probably live a good many years afterwards?—I have no doubt of that at all; the great economic difficulty is, that once a man has learned an employment and has become economically useful it is not easy to learn a new trade and become economically as beneficial to himself.

4486. Now, we might pass to a point that will be interesting, and that we have not had much evidence about—ammonium chloride?—Well, of course the effects of ammonium chloride are mostly observable in galvanising works, and I would like to put down my views regarding ammonium chloride. You are familiar, of course, with the process of galvanising, and the points I want to emphasise are, first, you have got your zinc bath, which is at a temperature of about 1,500 degrees.

4487. Fahrenheit?—Yes.

4488. No, it would not be anything like that, I should not think it would be above 800?—Well, 800 would suit my purpose; I do not know exactly the temperature. When you throw the ammonium chloride, as the workman does, over the surface of the bath to be rid of the zinc oxide, there are fumes arise. I have seen a man throw it on just as the casting was being removed. It really is not ammonium chloride that is given out, it is a decomposition of the ammonium chloride into ammonia and chlorine. You are not getting off what you throw on, in other words. The heat of the bath dissociates your ammonium chloride into ammonia and chlorine. Ammonium chloride is a substance that throat specialists give us to soothe our throats when we are ill—the fumes of ammonium chloride. Now, obviously what is meant here is the effects of the use of ammonium chloride in certain trades. Well, in the galvanising trade perhaps what does happen is that you throw your ammonium chloride on the hot bath of zinc, and dissociate your salt of ammonium chloride into ammonia vapour and chlorine vapour. The effect of throwing the ammonium chloride on the zinc is so irritating to my respiratory passages that when I have been present when it was done I have had to leave the place.

4489. That would be easily tested by litmus paper?—Yes.

4490. You feel quite certain about that dissociation?—I have not tested it chemically, they do not allow you to make experiments.

4491. And you suggest that that is the reason why the ventilators above rust so extremely rapidly?—Yes, and it is why I find in galvanising works that they are not in operation; when I go to these places most of the ventilating apparatus is not working; it is not fit to work, it has gone to pieces.

4492. Would not it be possible to add some other chemical, such as lime, or something of that sort, on the surface of the bath to take off the chlorine; would lime absorb the chlorine as fast as it was formed?—There is great difficulty there; there is a layer of zinc oxide formed, and that would look objectionable on a new casting which was newly galvanised. At the

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moment of their taking the casting out they throw on the ammonium chloride to form the zinc chloride.

4493. I understood the use of ammonium chloride was to remove the oxide from the iron?—No, it is not, it is to remove the oxide from the oxide of zinc on the surface of the bath.

4494. We understand that your view is this, that when the ammonium chloride is thrown on it is dissociated, and that it is probably the chlorine that is doing the mischief?—Yes, probably the chlorine and the free ammonia.

4495. And that you would recommend some experiments being tried to settle what the fumes really consist of?—Yes.

4496. You are very doubtful of the bad effects of ammonium chloride itself?—As the fumes of ammonium chloride are prescribed by throat physicians.

4497. And it is your suspicion that any harm that results is due to chlorine and ammonia?—Yes.

4498. Ammonia is distinctly deleterious?—Yes, it is so irritating to the respiratory passages that people have died from exposure to an accidental break of a carboy.

4499. You would expect to find that men who got ill in galvanising works presented the same features of illness as those you have already described in chlorine factories?—Yes, exactly, because they get exposed to hydrochloric fumes when the hydrochloric acid is evaporating off.

4500. Take another trade, where instead of ammonium chloride hydrochloric acid and chloride of zinc are used, that is, the tinning trade?—Yes, I do not know it.

4501. We have had a good deal of evidence about that, and we suggest it would be also wise to consider it?—I think you are in all these things getting closer to the chemistry.

4502. You would suggest testing for chlorine?—Yes, and it should not be difficult.

4503. To get rid of that free chlorine somehow or other is the real remedy to be got at in tackling that problem?—Yes.

4504. (Dr. Legge.) You do not offer any remarks on the health of the workers in galvanising works; you have not the same experience of them that you have of alkali workers?—No, you will never find any men ill in a galvanising work, they get good wages, and as long as they can hold on they will do so.

4505. Do you find the same condition of the teeth?—No, they will not permit me to examine them, and they never have doctors in their works.

4506. You would expect that if your view regarding chlorine is right their teeth would be affected in the same way as in the chlorine works?—Yes, but there is one thing to be noted, and that is, in the galvanising work the work is intermittent. They have spells when they have comparatively little to do, and spells when they have a great deal to do. I know two or three works in this city, one of which is pretty well constantly employed, where you will find the teeth of the workers fairly covered, and one or two others where you will not find that, because they are not so busily employed.

4507. (Professor Allbutt.) You told us that a great deal depends on the way a man breathes, whether through his nostrils or mouth?—Yes.

4508. Then from the time the lungs began to be less efficient, either from fixation of the chest or the commencement of fibroid phthisis, he would breathe more and more through his mouth?—Yes. There is another thing I would like to say, and that is this, that there is nothing contributes to early lung disease more than a cramped position of the chest; that is an additional point.

4509. (Chairman.) Now, we might pass to carbon monoxide, and I should like, in dealing with that point, to remind you that the law has treated as an accident a man overcome suddenly with carbon monoxide, and consequently this Committee is rather concerned with the permanent effects, if any, of carbon monoxide?—Yes.

4510. We should value any evidence you can give on the permanent results of carbon monoxide?—The only observations I have crystallized are observations with regard to women laundry workers who work with gas heated box irons—box irons heated with gas jets.

Whenever the iron gets heated there is an increase of carbon monoxide, and these women bending over the irons get the benefit of it. I have noticed fresh healthy young women go into a laundry, and within six months become absolutely bleached, colourless, anæmic, useless, and get knocked off work, and unless they were sent away to the country were apt to break down in health. Now, I have not been able positively to say that that is due to carbon monoxide and to no other cause, simply by reason of the fact of the difficulty of diagnosis. There is only one way of fixing the diagnosis of carbon monoxide mischief, and that is by examination of the blood by making minute micro-spectroscopic analysis. I must confess that I have not, with this inquiry in view, had opportunities of examining the blood of those women, but I should like to draw the attention of the Committee to the likelihood of there being spectra of carbon monoxide hæmoglobin found in the blood of the women.

4511-2. The traces would be very small?—Yes, you get the spectrum, and if you get that it is all you want.

4513. What would be the effect on the health of very small quantities—not enough to overcome you?—There would be bloodlessness—anæmia.

4514. I thought that one of the peculiarities of carbon monoxide poisoning was that where men have died with it their faces have been found quite red?—But I thought we were not talking of that.

4515. Would the effect of a very slow poisoning be to make them bloodless and pale, whereas rapid poisoning would make them red?—Yes, I expected to have brought with me a series of papers I have been publishing in the "Lancet" on the subject.

4516. I think it would be very valuable if you could let us have them?—Yes, I can send you copies of them. I have been trying to keep before my mind entirely the chronic form of poisoning rather than the acute poisoning. There is no difficulty about the man who is poisoned by carbon monoxide.

4517. It causes a considerable redness?—Yes, and that is due to this, the carbon monoxide forms with the colouring matter of the blood a new compound which is highly red, and remains so, and if you cut into human bodies where death has been due to this, when you do it the first time you get a shock that you never afterwards get over, because when you really cut into the body the blood is red and not dark as it ought to be. That is due to the formation of this compound, but whenever you are dealing with cases in which the amount absorbed is infinitesimally small there never is enough of the new compound formed to give the blood the colour that it gets in the acute cases. The effect of a small quantity in the blood in the case I am thinking of tends to depreciate the colouring matter of the blood generally. That is to say, the corpuscles do not carry the oxygen to the tissues as they should do, and the person gets weaker, and there is with the bloodlessness, palpitation, difficulty in going upstairs, a gradual falling away of menstruation, and you very often get nervous symptoms. I have seen cases of young women in laundries who have actually been on the verge of taking to drink to get over the feeling of depression, because once they start the work they are loth to give it up, and try to help themselves by stimulants.

4518. It does not follow that the spectroscopic test may be conclusive; it may depend on the colouring matter?—You may get a spectroscopic test without the red matter being seen by the naked eye. I have discovered the presence of carbon monoxide in the blood when there was nothing about the blood from the naked eye appearance at least to give the least indication that it was there, even in cases of coal gas poisoning.

4519. These are the spectroscopic cases?—Yes.

4520. I suppose this chronic poisoning will be produced by gas irons for one thing?—Yes.

4521. And would it be got by stoves for another?—I believe that is another additional cause.

4522. Ordinary stoves?—Yes. Of course, as you will see in the paper I have referred to, what I am trying to warn the public of is that there has been of late years an enormous addition of water gas in the ordinary coal gas supply in the country, and that you are going to add to the risks of carbon monoxide poisoning by that very fact, and in ways that will not be easily discovered, consequently if you use water gas adulterant, either in gas irons or stoves, you are bound to add to the risks of carbon monoxide.

4523. Apart from the fact that the flame of gas playing on iron is supposed to produce a certain amount of carbon monoxide?—Yes, because you have it forming in extra quantity.

4524. That would be the simplest thing in the world to diagnose?—Yes, I should say so perfectly positively from my experience. I have been able to detect it in cases of persons who have been rendered for the time being really unconscious. The micro-spectroscopic test told me at once what I had to deal with.

4525. And you believe the chronic cases would show the very same thing?—Yes. It has never yet been done, and I would like to get the chance of doing it if I could.

4526. What about the Bunsen burner which is used so largely?—If properly mixed with air it does not give off any CO at all.

4527. Could not you examine the blood of one of these anæmic laundry girls?—I will try.

4528. It would help us greatly if you could examine the blood of two or three of these laundry girls from the point of view of the chronic effects of carbon monoxide?—I will certainly try what I can do.

4529. (*Dr. Legge.*) You have never had any cases of paralysis or peripheral neuritis from blast furnace works?—No, not personally. Doctor Scott, of Toll-cross, publishes one case, and as I understand he is coming here, you will be able to get particulars from him. If you want to get any further information on that point you will require to get it from French sources, recorded evidence of secondary facts of carbon monoxide poisoning.

4530. (*Chairman.*) Now, I think the last point is naphtha?—Well, possibly all that I want to say about naphtha is that it came under my observation when a lad was found dead as the result of it, and I am not able to speak, except from examination of several of his young fellow-workers, as to the symptoms from which they suffer, but if they are of any use to the Committee I will be glad to give them.

4531. We will be glad to have them?—I thought it was rather interesting, because I was rather unprepared myself for what I found. The case arose in this way; it was referred to me as Medical Legal Examiner for the Crown to inquire into this lad's death, and I found the following were the facts. He was employed in a waterproofing work in the neighbourhood of Glasgow. His duty was to superintend the stretching of long layers of cloth between pegs in what was called a drying-room after the cloth had been subjected to the waterproofing process. During the process of drying a large quantity of the strong-smelling substance, which was called naphtha, but what it really was I could not say—the people would not provide a sample for analysis, so I could not go further than the fact that it was called naphtha. This lad felt himself ill, as he had done before, and came up a short flight of stairs on to an upper landing outside the well in which this place was, and collapsed on the floor. He was carried out by two or three lads to the open air and died. His father raised an action of damages. The insurance people for the employers, the indemnifiers, declined to acknowledge liability, and the father had to raise an action in the Court of Session about the matter. After they saw my report they compromised the question, and gave the father, I think, £160 damages, but had the case not been fought he would not have received any damages, because the insurance people declined to acknowledge liability. Now, what these young lads complain of is, that they become first of all exhilarated, and then they become practically intoxicated, stagger about, lose all sense of distance, and all sense of danger, and sometimes collapse in a state of insensibility and remain in that state for some time, when they are either picked up by their neighbours or fortunately fall in a place where they are likely to recover. Four or five lads in this work have all suffered, and all, I think, have been more or less unconscious on more than one occasion. In the autumn of 1902 another case of death occurred in Glasgow in a similar works, only it was a gutta percha works, and the reason why I bring this case before you is that my impression is that I saw the case with the late Dr. Finlayson, who is dead, and whose then house-surgeon is dead, and as they both recorded the case in the British Medical Journal I take the liberty of mentioning it. That is the case of a man who, employed in a rubber and gutta percha factory, was found lying dead in the works. The case is referred to in the "British

Medical Journal," and I will be able to give Dr. Legge the references to it, and he will be able to get the whole facts there. It seemed to me to be very much on the lines of the carbon disulphide mischief.

4532. I suppose there would be an inquest or *post-mortem* examination on the body of the lad who died?—No, that was the extraordinary thing. The father of the lad was perfectly willing that a *post-mortem* examination should be made, and the insurance people, the indemnifiers of the employers, had this permission of the father in their hands, but at the last moment, just before the body was to be interred, they sent out a telegram stating, "*Post-mortem* examination not needed." Then, after the body was buried they denied all responsibility for the lad's death.

4533. How long ago did this occur?—In November, 1903.

4534. The present Notice of Accident Act was not in force then?—No. I am quite sure it was not a carbon disulphide case. I went to the place and made an examination. It is what they call naphtha, and I believe it is a form of naphtha; at least, that is my impression. Whether it is a pure naphtha or not I cannot say, because there are so many substances called naphtha that it is difficult to distinguish.

4535. But after all, it only proves that naphtha is capable of causing an accident?—Yes.

4536. You do not get a chronic disease from naphtha?—At least, we have no evidence of that.

4537. So that, so far as our present inquiry is concerned, we need not trouble ourselves much with these cases, because they are not cases of chronic diseases?—No.

4538. They are cases of accident, and would come under the Workmen's Compensation Act?—Yes, they would certainly. I can understand that perfectly.

4539-40. (*Dr. Legge.*) There were two more accidents from naphtha poisoning about a year ago in Glasgow in cleaning out a tank; I do not think they proved fatal—do you remember them?—They were accidents of the same kind as this one; I have got notes of these by me, but one accumulates a very large amount of material, and I am sorry that I have been ill or I would have had more material at my disposal.

4541. Is there such a thing as chrome poisoning, is that a right definition?—I have not seen any evidence of it, I am not prepared to say there is not, but I can imagine perfectly easily that if a man is exposed at a chrome work for a considerable period—a careless man, who does not take care of his mouth and wash his teeth, will absorb a certain amount of chromic acid to do mischief, but I do not know about that.

4542. Will you regard the effect that is produced by the action of chrome as an injury or a disease?—I would say an injury. I would say it is a poison in the sense that it would act imperceptibly, more or less.

4543. For the purposes of the schedule?—I would incline to call it disease.

4544. "Chrome ulceration, or ulceration of the skin, or mucous membrane produced by chrome"—would you consider that definition sufficient?—Yes, skin or mucous membrane, or cartilage, or deeper structure.

4545. If you have the skin and mucous membrane ulcerated it would include what went deeper?—You would require to have that before you got the deeper thing involved certainly, but that would not be a true definition of nasal perforation without the words, "Deeper structure."

4546. You have had experience which you need not detail to us of poisoning by arseniuretted hydrogen?—Yes.

4547. Do you think arsenical poisoning is sufficiently included by the term arseniuretted hydrogen?—I may say that I am about to publish a monograph on arseniuretted hydrogen poisoning. It seems to me to bulk more largely than it used to do. I have collected in the literature of the world something like between ninety and one hundred cases of arseniuretted hydrogen. My manuscript is all ready for the press. I understood up till now that the word arsenic, as included in the third schedule of the Act, would include arseniuretted hydrogen, and I took it as such, but I must say this poison is so fatal in its action and sometimes so insidious, and sometimes arises in such unlooked-for

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places, that I think if it could be done at all attention should be given to it in trade diseases.

4548. And an additional reason why emphasis should be laid on the difference of the symptoms is that medical men are not so familiar with it?—As a matter of fact, the cases to which my attention was drawn were extraordinary. I was telegraphed for to go and see a man who was suffering from a mysterious illness in Irvine. I found him suffering from unusual symptoms, but I came to the conclusion that he was suffering from some form of gaseous poison, probably arsenic. The doctors had never heard of it before, and there had been one or two cases interred of similar deaths under the term "Malignant jaundice." Well, I did not blame the medical men, because these cases arose in the most unlooked-for places during the making of bleaching powder. Now, how could arsenic get into bleaching powder? It was found that the people in this case

brought sulphur pyrites from Spain. Spanish pyrites contain a large quantity of arsenic. They made sulphuric acid from that pyrites, then hydrochloric acid from that, and bleaching powder from that. The mud collected at the bottom of a Welldon's retort, but after it was thoroughly silted the man went down with a zinc pail and an iron shovel and carried out Marsh's test on a large scale, generated arseniuretted hydrogen and killed himself. They have been using wooden shovels ever since, and they have not had any more cases. It is really extraordinary when you come to consider the amount of simple chemistry involved in some of these things. The remedies are so simple when they can be traced out. The great difficulty is that the very men who should see most carefully to get the remedies carried out are the people who won't do it. If there is any other point on which I can give information I shall send it on.

Mr. ALEXANDER SCOTT, M.D., called in and Examined.

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4549. (Chairman.) You were formerly a general practitioner among an industrial population, and you are at present a certifying Factory Surgeon, Senior Physician to the Outdoor Department of the Glasgow Royal Infirmary, and deputy visiting physician for eleven years, Consulting Physician to Bellefield Sanatorium for Consumption and other forms of tuberculous diseases?—Yes.

4550. I think you have made a number of contributions to medical journals on industrial diseases—lead poisoning, carbon monoxide poisoning, mercurial poisoning, neurosis of railway servants, anthrax, etc.?—Yes, and others.

4551. We should like you to give us your view on a selected number of industrial diseases?—Yes.

4552. You might take them one after the other. The first we will take is fibrosis of the lung?—Yes.

4553. It was common among miners twenty-five or thirty years ago?—Very common when I began practice.

4554. It is not nearly so common now?—Nothing like it, it is rarely seen, even in the hospital.

4555. The disease that existed twenty-five or thirty years ago—did you attribute it to coal dust, or rock dust, or what sort of dust?—I found in my investigation among these men that it was those colliers who as they said took bargains that suffered. That is to say, they went to a new part of a mine and wrought there. They were intelligent men, and they wrought in that very bad air, and therefore got cut up very much sooner. They were cut up by the particles of rock and coal that they pass through, but it was generally that class of men among the miners that I discovered suffered from that disease.

4556. But will coal dust, apart from rock dust, cause fibrosis, or is it rock dust?—Rock dust. The deposit of the dust itself lowers the vitality, but the rock dust actually cuts up.

4557. I thought that fibrosis could not be produced by coal dust alone?—No, I would not say so; it is possible that there might be particles of coal large enough to cause an injury to the minute structures.

4558. It is the rock dust really?—Yes.

4559. How is the rock dust produced—by drilling in the rock?—Yes, holeing, as they call it.

4560. We know, of course, a good deal about that; what was it that was known as the black spit?—Melanosis; we examined that spit very carefully, and, strange to say, the blackness was mostly composed of carbon from the burning of the lamps—the wicks. That was the case, and I remember Professor Coats, of Glasgow, making the same remark to me that really the deposit itself was generally the carbon which was said to come from the lamps of the miners.

4561. Now, fibroid phthisis, as a disease, is still met with frequently?—Yes, it is quite common.

4562. How do you distinguish fibroid phthisis from tuberculous phthisis?—The fibroid phthisis we see now is practically a tubercular disease, but the great distinguishing feature in a fibroid phthisis is its contractility, that is, shrinking of the lung, and as it goes on there is generally a change of position in the organs of the chest, such as the heart, caused by that shrink-

ing. Supposing, now, that I had found a case of a typical fibrosis, I would expect first of all a contracted condition of the lung, a shrinking of the lung. Then as that went on it would take up less space, and the other organs would generally be found not in their normal position. Then, if it was a pure case of fibroid disease, arising from, say, a mason's trade, or a man in a quarry, or a collier who was making a new way in a mine, the distinguishing feature would there be the presence or absence of tubercular bacilli. It would be my first investigation to find that out. If I did not find bacilli, and I found that there was a dulness in the lung and contractions, etc., then I would consider it non-tuberculous.

4563. Are you speaking of a *post-mortem* examination?—Even in examination, supposing I was demonstrating it to students I would find that. A suggested case would be one in which you would find these symptoms or signs which I have already spoken of, and yet the absence of tubercular bacilli—for I find that even in fibroid disease among drapers where the door is very often shut up with cloth, or shop girls in ready-made cloth shops, or seamstresses—it is in those that I find most instances of fibroid disease of the lungs. Now, in the case of a man that had acquired it by his trade, I would say that it would not run such a chronic course as in those engaged in those trades; he would be cut up very much sooner, and, as I have already said, there will be an absence, or almost entire absence of the tubercular bacilli.

4564. But to what sort of dust do you attribute the fibrosis of drapers, shop girls and seamstresses?—That is a different form; I would say it was just as much from an infection of tubercular disease, where they had not got plenty of fresh air, not very much ventilation, not sufficient sunshine—I would say it was due to that more than anything else.

4565. The infection of tubercular disease?—Yes.

4566. But we are speaking of non-tubercular phthisis?—Well, I do not think I can find many non-tubercular fibroid cases of phthisis among the drapers and seamstresses.

4567. But, still, it would be fibroid?—It would be distinctly.

4568. Can you get fibroid phthisis without an irritating dust, such as silicate or steel?—Anything that would lower the vitality of the lung would predispose it to fibroid phthisis.

4569. (Professor Allbutt.) I think we might clear the way a little; we mean by fibroid phthisis one species of consumption?—Yes.

4570. Tuberculous phthisis or any other phthisis may have something of a fibroid character; but the Chairman intended to use the term fibroid phthisis as a phthisis due to inhalation of grit?—Well, I simply wanted to say it was very difficult to differentiate between a fibroid phthisis that arose in a miner and a fibroid phthisis that arose among women, for example, who are not engaged under the same conditions.

4571. This raises rather a difficult point, because according to your view a good deal of phthisis can be got through their occupation by drapers, shop-girls, and seamstresses?—Yes, I say so.

4572. And yet the conditions must be very variable, because even in the same shops some materials will be much more dusty than others?—Yes, there are certain workshops or shops themselves in which the conditions are very much more favourable for the development of phthisis than others.

4573. You would not suggest that drapers, shop girls, and seamstresses get this dust phthisis in anything like the degree that grinders, we will say, get it?—Well, it is pretty common, from my experience in the infirmary.

4574. Another point then. Would you be prepared to say that shop girls and drapers dealing with these materials get phthisis to an extent more than the rest of the population?—I would, that is my experience.

4575. Would you go so far as to say that it was a disease specific to their calling or rather one to arise in any person under depressing conditions?—No, I would not say it was specific, but just from my own experience that is what I say.

4576. Do you attribute the dust to the drapery?—I have examined even that dust with negative results.

4577. So although a fibroid phthisis it seems it is not a fibroid phthisis due to dust?—That is so.

4578. Would it be convenient to use the term "fibroid phthisis" as signifying phthisis due to grit, and to call your shops girls' phthisis merely chronic phthisis?—That would do.

4579. When you are speaking to the Chairman it might be convenient for you to use the name "fibroid phthisis" for that which is more or less produced by grit, and chronic phthisis for any phthisis which is slow in its nature?—Yes.

(*Professor Allbutt*) (to the *Chairman*). Or we might perhaps drop the word "fibroid" and put in the word "gritty."

(*Chairman*.) Yes.

4580. (*Chairman*.) According to that definition these seamstresses and shop girls would have tuberculous phthisis?—Yes.

4581. Although there were some appearances of a fibroid character?—Yes, a very close resemblance.

4582. So in that sense the phthisis of a domestic servant might exhibit certain fibroid characteristics?—Yes.

4583. (*Dr. Legge*.) At what age do you find marked tubercular phthisis among these drapers' assistants?—In very early youth.

4584. When do you expect to get the gritty phthisis?—In gritty phthisis there is the history of working under certain conditions, and it is generally more chronic in its nature.

4585. So the one is a disease of the young and the other of the middle aged?—Yes, I would say about 40 years of age. That is among miners especially, I have seen very little of it either in the hospital or out of it.

4586. Supposing that in the third schedule gritty phthisis were put down as a disease for which compensation was payable and tubercular phthisis should be left out—take the case of men employed on grinding?—Yes.

4587. Would you say if they have gritty phthisis it is due to the grinding?—Yes.

4588. If they have gritty phthisis you would say that is the common lot of machine grinders, but would it be fairly easy for a doctor observing a case to distinguish in the large majority of cases the one from the other so as to be able to tell whether a man ought to have compensation or not?—Generally it would be. Of course there are certain points which would lead you to suppose that it was due to a man's work. For example, if it had come on gradually, if it knocked the man up, say, at early middle life, say at forty years of age, if he had the symptoms of fibroid phthisis up till then, if the tubercular bacilli were not numerous or absent—the family history might also be taken into account—if we got a man, say, at forty years of age suffering from such things, or rather in such circumstances, I would say it was a case in which a man ought to be compensated, because his condition had arisen through his work. If, however, a man went on till he was an old man—we have miners working now at 60 or 70 years of age—and he had, say, shortness of breath and bronchitis, but besides that there

were tubercular bacilli, if there was a family history to help you in your diagnosis, though the vitality of the lung had been lowered by his employment, I do not think that that had been to such an extent as to render him entitled to compensation.

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4589. Then, according to your view, it would be possible to distinguish; there might be difficulties, but it would not be an impossible task for medical men to make the distinction?—It would not, with these obtrusive points before them—that is, with grinders, hewers, and miners.

4590. But from the point of view of a right to compensation, the drapers, shop girls, and seamstresses do not seem to stand on the same footing with men like grinders as far as compensation is concerned?—No, they do not.

4591-96. In phthisis due to grit is the average temperature normal or sub-normal?—That is a point I forgot to mention; it is a thing I have taken a good deal of interest in. Generally if it is not tubercular the temperature is normal or sub-normal, and the man will cough and suffer from dyspnoea. You will find that, normal or sub-normal, if it is not tubercular.

4597. But if it is tubercular?—The temperature rises at night and falls in the morning as usual.

4598. You have put down "Suffering from bronchitis and dyspnoea"?—Yes, bronchitis and shortness of breath, and when I began practice the colliers used to come and get their bottles filled for that just as regularly as they went for their food, but we never see that now.

4599. Then there would be a "dulness on percussion with contraction or shrinkage of lung"?—Yes.

4600. Do you lay stress on the examination of the sputum?—Yes; that is what I would call a suggestion.

4601. You would not be prepared to make the examination of the sputum absolutely conclusive; that is to say, if there was some bacilli in it you would not say it was absolutely conclusive one way or another, but it would be an indication to a certain extent?—Yes, it would be.

4602. (*Professor Allbutt*.) You have said if the bacilli were in moderate quantity or absent?—Yes, not many—not numerous or negative.

4603. (*Chairman*.) What occupations do you think the gritty phthisis may be considered as an attending phenomenon of; first, there is grinding of all sorts—metal grinding, both brass and steel; then potters' rot will be another, I suppose?—Yes.

4604. Then there will be ganister mining of all sorts?—Yes.

4605. Would you put basic slag down?—I could not say that I have much experience of it.

4606. Are there any others you can add to those I have given?—Hewers, masons; I would put a hewer down especially.

4607. How would you define a hewer?—A man who prepares the stone for some part of the building, making it smooth; and he goes round the corner. He is well paid and continually at it, breathing in the dust.

4608. Is that what we call in England ashlar?—I think that is more of a coarser nature than hewing.

4609. Is there any other trade that occurs to you besides those you have mentioned?—No.

4610. Would there be any similar danger in brick-making or cement-making?—No; there is the dust, but that is nothing. In the same way, my experience in the examination of this has not been so serious as I anticipated when I began work.

4611. Is it silicious?—Yes.

4612. (*Professor Allbutt*.) Of course, diagnosis in matters of this kind at the best can only amount to probability, though in certain cases to a high degree of probability?—Yes.

4613. But, granting adequate information, and without this we can never expect it to go to high degrees of probability, the grounds you have given us for diagnosing ordinary gritty phthisis and tubercular phthisis seem to amount to a considerable opportunity of diagnosis?—Yes.

4614. I thought perhaps you were a little pessimistic about your clinical diagnosis, seeing that you gave us very fair grounds of definition which would be applicable in, say, 90 per cent. of cases?—Yes.

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4615. Such as a normal temperature, and a cough and dyspnoea, bearing a very large proportion to the physical signs, which at any rate during a very large part of that state are, comparatively speaking, almost insignificant; is that in accordance with your experience?—Yes.

4616. That is a very general experience?—Yes.

4617. And it is a very important guide to the discrimination of cases?—Yes.

4618. In well-marked cases there might not be much difficulty?—That is so.

4619. But there would be doubtful cases in which the physical signs were inconclusive?—Yes.

4620. I think you have accepted that very important point about the temperature?—Yes, an interesting point—the presence of the tubercular bacilli.

4621. You have contemplated the supervention of some degree of tuberculosis?—Yes.

4622. So long as this is moderate in extent, so far as we can estimate it by microscopic examination, this would not for the purposes of our present inquiry take the case out of the category of gritty phthisis?—No.

4623. And supposing the man had been getting more and more incapacitated for 15 or 20 years, and that at the end of that time the evidences of tuberculosis became very considerable, are we still to be justified in looking upon his case as one of gritty phthisis?—I would not like to say that—I do not think we could say that; no, if I were to say it I would still go back to my early middle life—the man is there, and his lung is in that condition at that age. The man appears before you for examination under the Compensation Act, and he is only 40 years of age.

4624. And he would be incapacitated for work before he was likely to have an acute supervention of tuberculosis?—Yes.

4625. Put it in this way, that the difficulty I have been putting to you is a difficulty that practically would not arise?—Yes.

4626. (*Dr. Legge.*) We have had a good many witnesses before us on the subject, and several of them have described the characteristic appearance of the workers who suffer from fibrosis of the lungs; have you any note to add?—Nothing but the kind of emphysematous look of the chest.

4627. I was thinking of the anæmia?—Yes.

4628. (*Professor Allbutt.*) You have examined a great many of those people in a comparatively early stage of gritty phthisis?—Yes.

4629. Supposing a man had been engaged in this work 10 years, having started at 18 years of age, and you examined him at 28 years of age, would you expect to find very much change?—No.

4630. If he had been engaged twice that time, 20 years, you would expect to have some signs?—Yes.

4631. Please tell us what would be the earliest sign which would incline you to suspect the presence of fibrosis?—The first would be bronchitis—continued bronchitis and shortness of breath.

4632. I was rather speaking of the physical signs?—They are still indefinite; you could have a suspicion.

4633. Although a man may be very ill, yet his physical signs would be indefinite?—Yes.

4634. (*Chairman.*) Come now to the neurosis due to vibration; you have, I think, had experience of boiler-makers who use pneumatic hammers for rivetting and boring holes?—Yes.

4635. There is not much percussion in the boring—it is a continuous action?—Yes, but still there is some.

4636. There is a little vibrating, oscillating machine?—Yes.

4637. The characteristics produced by considerable use of these tools for some time are tremors?—Yes.

4638. Sleeplessness?—Yes.

4639. Sleep not refreshing?—Yes.

4640. Having dreams and jerking movements of the muscles during sleep?—Yes, which is not a symptom I have found.

4641. The development of it is slow?—Very.

4642. And there appears to be no permanent incapacity derived from it?—Not one case did I find, and I examined them most carefully after I got your note. I may say that there was one man, who was known

throughout several works, who could tell me that So-and-so had been knocked up, and I went and hunted him up at the work he was engaged on. I found he had been employed for six and a half years, and owing to these symptoms which you have already mentioned his medical man had told him he must give up this work. I asked him into the office and examined him. He was a highly neurotic, excitable man. He appeared to be in normal health otherwise. The work had been resumed for eight days, and he had gone back to the pneumatic tool. I examined his reflexes, and there were distinct tremors in both hands and arms. He had just come from his work. I asked him if this had ever incapacitated him for his work, and he said no. Had he ever been off, and he said yes, he had suffered from bronchitis and was on his society, but from this ailment he had never been incapacitated for his work. Now there was nothing remarkable about this man other than his neurotic expression and neurotic tendency, and all that I could find were the tremors which I have already described. But it was after the New Year festivities, and I asked him if he indulged in alcohol to any extent. He said, "Well, no," I said, "Now, you generally do take it on Saturday night," and his answer, which was very characteristic, was, "I make no exceptions," so that he took a little drop as he needed it, and I thought that probably a good deal of the neurosis was due to the festivities he had already been enjoying at the New Year. Well, that was the only case that I really could get in my whole evidence that really had to change the employment owing to the vibration. I am giving you the concomitant circumstances. I examined a great many others.

4643. You could not suggest this vibration seriously as a subject for compensation?—Not in the remotest way could I do it. I got my hand on their body and hands, and even when the hose was coiled round their body, with all the tremor going on, they would come out and speak to me and be quite right. One thing I noticed very markedly was that those who tipped—that is, made no exceptions or perhaps took a little too much—had the tremors quite distinctly. One man who had been at the work for five years had not a sign of it, and I asked him, and he said, "Dr. Scott, I never tasted it in my life."

4644. It is really chronic alcoholism all the time?—Yes; the circumstances were there, any way, and they were most marked to me.

4645. (*Dr. Legge.*) Have you any observation on the deafness produced by boiler-makers owing to the noise of their work?—Yes, every man of them is deaf; there is not one but what is deaf.

4646. What degree of deafness is there—they can hear persons talking?—You have to talk very loudly to them, but I never made any test of their hearing. The deafness is very marked, and the tympanum must be very much weakened.

4647. Do you think that is a subject for compensation?—I do not think so; it does not interfere with their work or their power of work, and you know that the noise is extraordinary in a boiler work.

4648. There is no means of preventing that noise?—No.

4649. Is not there a mode of stopping the ears up?—Yes, putting something in their ears; but they will not do that, although it would ease it very much.

4650. It would do good?—If cotton wool is put in it allays the oscillation of the tympanum.

4651. But it does not prevent deafness?—It would preserve their hearing.

4652. And would prevent their getting deaf?—Yes, but they will not do it.

4653. If they will not do it, it does not seem they are very much annoyed by the deafness?—No.

4654. Do you know of any case where permanent deafness has been produced?—No, not one.

4655. Have you not had experience of neurosis due to vibration in car drivers and engine drivers?—Yes; I would ascribe that more to the excitement, the nervous tension, in car drivers and engine drivers. When I wrote my paper on the subject I gathered a good many cases of that.

4656. You do not consider such cases analogous to the boiler-makers?—No, it is purely nervous; in all the cases I had not one of them could I ascribe to that vibration.

4657. Is it not a subject for inquiry?—Yes, but there is no mention of it.

4658. Would you describe the particulars?—Well, the last case I had was that of a stationmaster. The common symptoms are, first, sleeplessness; then he dreams and feels as if he were always in a fright, and if you set him down to talk to you he will probably fall asleep, but yet when he goes to bed he cannot sleep at all. If you put your hand on his skin he is almost always bathed in a cold perspiration. In one of the cases there was nervous vomiting dyspepsia, and in two of the cases I have had convulsions.

4659. These are car drivers?—And locomotive engine drivers. I would say first of all that the first case I did see was an engine driver. He was a man certainly who was not fit, from a nervous point of view, for any such employment, and his prominent symptom was dyspepsia, but the strange thing was that you could not discover what his dyspepsia was due to, do what you like. I sent him to a specialist in Glasgow, and he simply laughed and said, "Did Dr. Scott send you to me? I will soon put you right." He was never a bit better, and the vomiting and the dyspepsia continued so badly that I really thought his mind was going to become unhinged. However, it happened one day when he was driving his engine that he lost so much control over it that it ran into a siding. There was a smash, and he was dismissed. That man is living to this day; he is quite well, and has never been ill since. He sells coal on the street, and is doing well. I could go on interminably; I have been collecting these cases. There was one very marked case of a signalman who was found by the stationmaster writhing in convulsions in his box, quite unconscious. These convulsions had been preceded by the symptoms I have already mentioned. At the last serious accident in St. Enoch Station I wrote to the Board of Trade and pointed out that the engine driver was simply not fit for his work. His whole endeavour had been to maintain a certain record in his work, and he lost control, as it were, of his engine, which was entirely due to the condition of his nervous system.

4660. (*Professor Allbutt.*) What hours do you think these men were working?—There was one of the men working much longer than eight hours, and I wrote a letter to the "Times," which was not published, in which I pointed out that they said they had so many hours in the week to work, but that did not mean eight hours per day.

4661. It was piled on unequally?—Yes. I have had several cases of that kind, and I wrote to the "Times," but they did not publish the letter.

4662. (*Dr. Legge.*) Did you think these men, if they had been off work for a certain length of time, would have got better and been able to resume their work?—In certain cases they would, but some of the men would never have been fit for that kind of work.

4663. It would have been right that they should not have been in it?—Yes. In the case of a tramcar driver I wrote to the doctor for the Tramcar Men's Society and told him that if he would give the man a holiday he would be all right. He has done that, and he has got all right.

4664. (*Chairman.*) In order to recover his nerves?—Yes.

4665. (*Dr. Legge.*) Is the condition of their nerves due as much to their employment as fibroid phthisis may be?—Yes, that is my opinion, come to after all these years working at it.

4666. Is there any particular designation that the illness could be described as?—I call it neurosis of railway servants.

4667. Has your attention been called to neurosis among the railway car attendants?—I had just one, I think, that ever consulted me. It was persistent headache, but it was not a very marked case. That is the only one I have had of the attendants, but I have had stationmasters, engine drivers, and signalmen. I had also a railway porter, but he was acting as a signalman when he contracted the complaint.

4668. (*Professor Allbutt.*) I was not thinking of porters, as they are scarcely under high tension?—It was a beautiful case; there was a man came to me at the infirmary. He had come from the country, having been recommended by some person as a good workman, and he was given this kind of work. While he was in the country he simply had no brain work whatever,

but he had to do a little of that when he came to the town, and the stir knocked him off his head altogether.

4669. Has it occurred to you that in the case of the engine drivers, the signalmen, and the car drivers, the ocular refraction might be concerned in the matter?—Yes, I have seen their eyes affected, not simply with pure astigmatism, but very like it.

4670. Do you not think that this neurotic strain may be largely ocular?—It is quite possible.

4671. I suggest that from my own experience many of these cases might be explained as ocular strain, and be curable by spectacles?—Yes; but you dare not speak to a railwayman about glasses.

4672. But errors of refraction might be determined by a systematic examination of their eyes?—Yes, I have pointed that out many a time.

4673. You think that, at any rate, is a step that ought to be taken?—Yes.

4674. (*Chairman.*) What proportion of engine drivers would be likely to get this? Out of one hundred drivers engaged, what proportion do you think would very likely become subject to neurosis?—A comparatively small proportion.

4675. Then it is due really to the effect of an occupation upon a man who is unfit for it?—Yes, in a large measure, certainly.

4676. It is that the men are not fit for the work they are going to do—it is not a condition that would be expected to arise naturally?—No.

4677. If a man had a predisposition to lunacy, many occupations might make him a complete lunatic?—Yes.

4678. And in that case it would be rather a curious philosophical question to ask which was the cause of the lunacy—the man or his occupation?—Yes, I do not think the two cases are exactly parallel in the engine driver or the car driver, because the strain that goes on there for a certain time tells on his nervous power, and, therefore, he suffers from his occupation. The best of them will suffer from that; but there are certain who should never be in the work at all. Still, taking any of ourselves for example, if your mind is continually working away, it will get tired very soon. If you apply that to a man who is driving an engine, and has a number of people's lives under his care, or take the case of that young man I have already mentioned, who drove the ill-fated engine at the St. Enoch disaster, whose whole heart and soul were in his work, and who wished to maintain his fine record. You can see how that would exhaust the nervous tissue very considerably, and that he would suffer from his work.

4679. But is not neurosis due to excitement produced by a desire to pursue a difficult occupation characteristic also of bank clerks and all sorts of people?—To a less degree, certainly I would say so.

4680. It would seem to me that the desire to carry through a difficult occupation with credit to yourself is one thing, and the shaking and vibration is another?—Yes.

4681. And that fear of accident and the nervous strain caused by the fear of accident, is a third—I could imagine such a man getting in such a condition that it might be called an industrial disease?—Yes.

4682. And that becomes complicated by the fact that a large portion of the disease is due to an anxious desire to excel?—Yes, or an anxious care over his charge.

4683. For instance, you must have seen medical students get a certain amount of neurosis from anxiety over their examinations?—Yes, at a certain time.

4684. But not so much as these engine drivers?—No.

4685. (*Dr. Legge.*) This is not a condition that men would be likely to malingering?—They could not.

4686-7. And at the present time the railway companies must give a number of these people holidays when they want them, and pay them during the time they are away?—Yes. At the time I wrote my paper it was published, and the newspapers took notice of it, I was told that the railway companies were far more enamoured of my views than the railwaymen. The railwaymen did not like it at all; they thought we were interfering too much with them. The railway companies, just as you say, were very willing to do anything in that way; they admitted that I was right, and they would be very willing to give them holidays.

4688. (*Professor Allbutt.*) Could you lay your hands

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on a number of these men—have you got their addresses—because I think the Chairman would probably authorise you to have their refraction tested; in these occupations there must be intense fixation of sight?—Yes.

4689. Unless their eyes are perfectly true, there must be great optical strain?—Yes.

4690. Especially if they are astigmatic?—Yes.

4691. And the strain may be very great?—Yes.

4692. It would be very important to have refractive indices?—I would be very pleased if I could lay my hands on them, but in my last case the man has not called upon me for a good while.

4693. (*Chairman.*) The next point we take is carbonic oxide poisoning; I am not going to ask you about the immediate violent effects of the carbonic oxide which really constitute an accident, and is therefore already provided for under the Act?—Yes.

4694. But I believe a certain amount of carbonic oxide is found in ammonia works?—Yes.

4695. How does that arise?—In the manufacture of ammonia; it is fired by gas, and there is a good deal of it comes out.

4696. What we want to know is whether you can give any evidence to the effect that a chronic disease is produced by this carbonic oxide?—Not one case that ever I knew.

4697. But you think, apparently from your notes, that although the worker is thin and the skin presents a withered appearance, his general health is not materially affected?—Not the slightest.

4698. Does he appear anæmic?—No, it is a kind of smoky appearance his skin gets. It is not pure anæmia, it is generally a yellowish dusky colour.

4699. You are sure that it is not due to the ammonia instead of the carbonic oxide?—No, I think not; I think in all the cases I have seen they were generally firemen, and that was the colour they assumed, but their health was not affected.

4700. But it might be the heat also?—Yes.

4701. Have you had any opportunity of examining the blood of any of these men?—Yes, I have had.

4702. I mean a man in a chronic condition and not poisoned suddenly?—Yes.

4703. The question before us is whether a man who works at this and is breathing very small quantities—whether, if you examined the blood, it would show a characteristic?—I never did examine it.

4704. Perhaps you will get an opportunity of doing one test?—Yes.

4705. Would you manage that for us?—Yes.

4706. Get a man whom you think would be affected by what you might call chronic C.O. poisoning, and then examine the blood by a microscope?—Yes, I will try that; I will do my best.

4707. Then poisoning by nitrous fumes from the use of explosives in coal mines, you are of opinion that the effect is always a temporary effect?—Yes.

4708. There is no permanent disease?—No.

4709. Are you able to say definitely that there is no permanent disease?—There is no permanent disease.

4710. Then with regard to dilatation of the heart?—Well, I had those four beautiful cases I have already mentioned arising from their work.

4711. What was their occupation? Diseases for which compensation is payable must be due to some

definite occupation. Compensation cannot be given to every man who has got dilatation of the heart; the disease must be due to the nature of his occupation?—What I wished to bring before you was the cases I had known of dilatation of the heart, which, to my mind, were due to the occupation.

4712. What occupation was it?—The first one was a miner.

4713. He was working too hard; there was too great exertion?—No. Dilatation is usually due to a sudden severe exertion; he had a hutch which he was trying to lift up on to the rails.

4714. But that is an accident, rupture has been held to be an accident?—Well, that was the first case I had.

4715. I think we might dismiss that as an accident, or nothing?—It was dilatation of the heart; they are all accidents in that case.

4716. Then I do not think we need deal with them.

4717. (*Professor Allbutt.*) The cumulative effects of a laborious occupation have not produced heart disease in your experience?—Never.

4718. (*Dr. Legge.*) In these particular cases do you know if they were treated as accidents, did the men get compensation?—No, that is the sore point.

4719. You found on examination of the heart that you could mark out the enlargement?—Yes.

4720. Did the man die within twelve months from it, was it the cause of death?—Yes, the first one.

4721. Did he die within twelve months?—Yes, and the second died within twelve months. The third was an infirmity patient.

4722. Have you had experience of trade eczemas in the match-box making, French polishing, and nickel-plating trades?—Yes, that is the whole three cases I had.

4723. Did these produce permanent or temporary incapacity for work?—Purely temporary.

4724. Of a grave character or not?—The second case of French polishing was very grave.

4725. Was it due to the turpentine or spirit?—It was due to a certain composition that had been sent to a cabinetmaker's, with the result that when it was used it caused this. Nobody knew what was the cause of it, and the person who sold the material confessed that he had changed it, and he had to pay the damages.

4726. But, still, it was eczema?—Yes.

4727. And the worker would not have had difficulty in proving that it was due to his occupation?—Not the slightest.

4728. Do french polishers as a rule suffer from eczema?—Not as a rule.

4729. There are definite cases?—There are cases.

4730-1. Is there eczema caused in nickel-plating?—Yes.

4732. Is that a regular thing?—Yes, it is pretty frequently found.

4733. And that incapacitates for work?—Yes, that is due to a varnish.

4734. Then in regard to match-box making?—That is simply because it was the last subject of the lot; it was the dampness and constant chafing there. That was the only case I saw there.

4735. I suppose we may say these are not very important cases?—Yes.

Professor ROBERT MUIR, M.D., called and examined.

Professor E. Muir, M.D.
4736. (*Chairman.*) You are a professor of pathology in Glasgow University?—Yes.

4737. You have come to speak to us with regard to diseases of the lungs resulting from dust inhalation?—Yes.

4738. I presume you mean gritty dust?—Yes.

4739. Silicious dust?—Yes.

4740. You have nothing to say with regard to the soft forms of dust?—No.

4741. It will be all gritty dust?—Yes, ordinary silicious dust, and coal dust, of course.

4742. You have had experience chiefly from post-mortem examinations, I believe?—Yes.

4743. And during 15 years you have conducted no less than 3,000?—About 3,000.

4744. Examinations of persons whose lungs have been affected?—No.

4745. 3,000 examinations altogether?—3,000 post-mortem examinations.

4746. And among those there have been a considerable number of cases of dust phthisis?—Yes, there have been.

4747. And you can give us some statistics?—With regard to recent years I can.

4748. What are the kinds of dust in the first place that you characterise as likely to produce these diseases?—Well, stone dust in general.

4749. That is silica in some form?—Yes.

4750. Will pure coal do it without any silica mixed with it?—It is very difficult to say; we certainly find very extensive carbon deposit in the lungs without any important change in the lungs. I think in most cases there is an admixture of silicious dust with the coal dust in the cases where there has been any serious change in the lungs.

4751. Are you in a position to say that coal dust alone would act as a centre of disturbance, set up irritation—would coal dust alone without any silica present set up what may be termed gritty phthisis?—I think there is usually some silicious deposit along with it. I would not be prepared to say that any very serious change is produced by the coal dust alone; you do get sometimes small fibrous nodules, but it is difficult to say whether they are due to pure coal dust or whether there may not be something else.

4752. Is there much of this dust phthisis among coal miners?—Not so far as my experience goes.

4753. That accords with what we have understood, that miners' phthisis will be found mostly in men who are working in the rock—silicious rock?—Yes.

4754. This dust phthisis is slowly developed and insidious?—Yes.

4755. And preceded by chronic bronchial catarrh?—Yes.

4756. What are the symptoms that you would expect to find?—The symptoms are those of chronic pulmonary disease in general, such as coughing, shortness of breath, etc.

4757. I suppose you need hardly describe them, because they are extremely well known?—Yes.

4758. Suppose that under the Workmen's Compensation Act it were decided to compensate workmen who had got dust but not those who had got merely tubercular phthisis, would you, as a doctor, distinguish pretty easily between those two different kinds before death—I mean between a man suffering from dust phthisis and a man suffering from merely tubercular phthisis?—I am in a position to appreciate the clinical difficulties; you are supposing that you have no information as to the occupation of the man.

4759. We will take that first. Supposing a man came to you and you found that his lungs were diseased, would you be able to say, "This man has grit phthisis" or "This man has not got grit phthisis, but phthisis due to another cause"; would you be able by an examination to say that, and if so in what cases?—No, I think that it is a matter of very extreme difficulty, to differentiate between any fibroid change in the lungs produced by some other cause and a fibrosis due to the dust.

4760. An examination of the sputum would be one method of getting at that?—Partly.

4761. You would partly get at it that way?—Yes.

4762. And then by tapping the man?—The only conclusion you can come to by tapping is that he has fibroid disease of the lungs.

4763. Then if you know the history of his employment?—There would be strong presumptive evidence.

4764. Would there be practical difficulty in doctors being able to distinguish between those cases that ought to be compensated as due to industrial employment and those that were due to other causes, hereditary causes or causes other than the employment?—I do not think it would be possible to be certain.

4765. I do not think anybody suggests that one could be absolutely certain; a jury are never certain in the verdict they give; you must act upon a reasonable degree of probability?—I think, taking into consideration the employment of the person, the condition of the sputum, the presence of dust in the sputum, the absence of tubercle bacilli, and the presence of fibrosis—I think all these things together would constitute fairly strong presumptive evidence.

4766. But you could do fair justice between the employer and the man—that is what it comes to—in putting down his disease to its right source, industrial or not industrial?—Well, on the whole, I think you

would be wrong in a certain proportion of cases, but perhaps not a very large proportion; you can come to the conclusion that the fibroid condition is present, and after that it is pretty much a matter of inference.

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4767. There might be some fibroid condition even with people who had not got their phthisis from an industrial source?—Yes.

4768. But the fibroid condition would be an indication, at all events?—The fibroid condition, of course, is the immediate effect; and then, of course, you may have the tuberculosis superadded—it is very often superadded.

4769. In other words, in such cases as I have mentioned it would not be impossible to do substantial justice with the aid of experienced medical men?—Really, after all, it depends so much on the view you take with regard to the evidence necessary.

4770. I put it to you in this way: supposing a law were made that those men who, working in gritty occupations, had caught grit phthisis, or become affected with grit phthisis, should be compensated, and those who had not got their phthisis from that cause should not be compensated, the question is, could you discriminate between the cases?—I ask what you really mean by grit phthisis.

4771. Well, phthisis caught by reason of breathing steel dust or silica dust?—You mean the fibrosis?

4772. Yes; well, fibrosis is almost a wider term; we have used the term grit phthisis because there can be no mistake about that?—Grit fibrosis, perhaps.

4773. If you like?—The important thing is the super-addition of tubercle.

4774. Would it be possible in the main to do substantial justice between the employer and the man; could you undertake, in fact, if you were invited to give an opinion after seeing the men and having their history and every information that was available given to you, to say this man ought to be compensated and that man ought not to be compensated?—I think I would be able, as you say, to do substantial justice.

4775. You have explained to us that there are many cases in which you would feel a considerable doubt, but in the great majority of cases you would be able to discriminate with tolerable certainty?—Of course, with the ordinary practitioner the results might be different.

4776. But then the ordinary practitioner would learn; having this task cast upon him, he would have to discriminate much more than he has now, and he would be aided, as the Act provides, by an appeal to a specialist in cases of doubt; assuming him to be assisted in doubtful cases by the very best talent that Scotland could provide, you think that on the whole substantial justice could be done?—I think substantial justice might be done on the whole. The difficulty would, however, be with cases of tuberculosis in stonemasons where the signs of silicosis were not distinct.

4777. What are the statistics which you were going to speak of?—It was just with regard to the relative number of cases.

4778. (*Professor Allbutt.*) Would you oblige us now by giving us your experience of the relation of tubercle to what we have been calling the grit phthisis?—Yes, I think the common history is that the fibrosis and fibrous nodules are produced by the inhalation of silicious dust, that then the lungs are rendered thereby much more sensitive to tubercle, and tubercle very often is superadded. The patient dies either through silicosis with complications or of tubercular phthisis of the ordinary type.

4779. If a man was submitting himself to a process of silicosis for some years would it not be in a measure some protection against tuberculosis whether in the lung itself or in the system?—I think I have seen more than once acute tuberculosis superadded to chronic silicosis.

4780. You think that the protection by fibrosis is not considerable?—No, I do not think it is much.

4781. I suppose it is true that in a chronic case of this kind lasting over 20 years, although tubercle may be present, that the tubercle complication is comparatively small clinically?—It may or it may not be; in some cases you may have only few nodules due to the silicosis and an extensive tubercular change, or conversely you may have much structural lesion due to the dust inhalation and a tubercular lesion of comparatively small extent.

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4782. Supposing that you had 20 people suffering from silicosis, I suppose it would have a fairly equable effect upon them all in respect of immunity—they would be fairly equally susceptible?—You mean that the effects of the inhalation of the dust on the lungs would be fairly uniform. I should doubt that very much; I should think there would be considerable variations in the effects—in the susceptibility.

4783. A good deal of variability?—Yes, I think so.

4784. Do any extreme cases of pulmonary silicosis find their way to the post-mortem table where there is no tubercle?—Yes, one sometimes meets with such a case.

4785. Can you give us any quantitative estimate about that; would you find a good many where there was no tubercle?—I was rather surprised to find—I went over my records for the last seven years—there are about 1,500 cases of ordinary post-mortems, and there are only six in which there are distinct lesions sufficient to enable one to call the case one of stonemasons' lung or grit phthisis. There is one of acute pulmonary tubercle, and I see three in all out of the six had tuberculosis; they died really from it.

4786. So far as small numbers go there would not be tubercle perhaps in more than 50 or 60 per cent.?—Well, the other two have died from intercurrent affections, so one can scarcely include them, and the last one died from cardiac complications, breathlessness, and œdema, no tuberculosis being present.

4787. There are, then, many cases—a substantial number—of this chronic fibrosis without tubercle in the lungs?—A fair number; the number who die without tubercle is not very large I think—I mean where the lungs show distinct silicosis without any tubercle.

4788. If you were put into a room with a certain patient who had chronic pulmonary disease, and you were only asked to examine him on that one occasion, we can understand it might be exceedingly difficult in many cases to give anything like a discriminating diagnosis; it would be very imperfect?—Yes.

4789. I think to give an answer in a case of this kind you must have full information that would include the whole of the man's past history of his ailment, and so on; in this way it would appear to us that a distinct diagnosis, judging from the evidence we have had, might be made with a fairly high degree of accuracy, if you knew everything that could reasonably be expected to be known. First of all, it is alleged there is a very slow history with shortness of breath, cough, and no fever over some considerable time, while, on the other hand, there are extremely ill-marked physical signs for the stage which the disease has attained, all of which makes a somewhat striking difference from cases of ordinary tuberculosis?—You are supposing a case without tubercular complication. I should think that of cases of that kind the diagnosis could be made correctly in a fairly large proportion.

4790. It is a different story, isn't it?—Quite.

4791. Especially when you have examined one or two of these people? You have examined a good many?—Yes.

4792. Would you tell us the state in which the lung is found in advanced cases of fibrosis?—There is very often chronic pleurisy of a marked kind, there is more or less thickening of the fibrous tissue all through the lungs, and there are always focal lesions in the form of

fibrous nodules which usually have a distinctly gritty character to the touch. Then in addition to that there is not infrequently some dilatation of the bronchi with a certain amount of small cavity formation.

4793. Bronchial dilatations?—Yes.

4794. Not much true excavation?—No.

4795. In which part of the lungs is that chiefly conspicuous?—I think it is pretty uniform in its distribution; perhaps, if anything, it is more marked in the upper lobe, I think so, if anything.

4796. It is not found chiefly at the root, for instance?—I do not think so.

4797. That being so, in a thick-chested, muscular man, a man who works with his arms, it would be very difficult to find areas of tubercle?—Yes.

4798. We were informed by Dr. Glaister this morning that the position of a grinder in handling the stone is one in which he leans forward and so presses against the stone, and he becomes fixed, as it were, in that position, and this being so he finds it more and more difficult to make deep respirations; have you any information about that?—No.

4799. Then you may not have information about what he went on to say, that it would make the man more liable to suffer from irritant in the lungs, owing to his low respiratory power, and so on, rendering him more subject?—I suppose there is a possibility.

4800. That is a little too refined?—I think so.

4801. Then fibrosis of the lung is not frequent here?—No, I think not; my impression is that it is fully more frequent in Edinburgh. My impression is that I had a larger proportion of cases in Edinburgh.

4802. Edinburgh is not a place where there are very many occupations involving dust?—There is a good deal of stone-working.

4803. How do you think Glasgow stands as regards exposure to the inhalation of grit as a place of occupation?—I have no means of judging of that.

4804. Fibrosis, then, here is rather rare, in fact?—Fibrosis due to that cause certainly seems to me to be comparatively rare.

4805. There is a great deal of difference between a very chronic tuberculous case with no grit in comparison with a lung which has become fibroid from the inhalation of grit?—Yes, so far as the pathological appearances are concerned.

4806. You would have no difficulty in diagnosing a case of chronic tubercle?—I think none whatever.

4807. There is a large amount of difference?—Yes.

4808. You say that, as a rule, it is difficult, and in many cases impossible, to say to what extent the disease is due to the inhalation of dust; that is a matter of evidence of a man's history, how he was employed?—Yes—I am speaking now from the clinical point of view.

4809. (Dr. Legge.) Have you had the opportunity of making *post-mortem* examinations of the lungs of flax workers?—No, I think I have not had any cases.

4810. You do not know whether you could find fibrosis such as you have described as due to silicious dust in the lungs of flax workers?—Of course, it is stated that fibrosis does occur, but I cannot speak from personal experience.

Mr. G. LOVELL GULLAND, M.D., F.R.C.P.E., called and examined.

Mr. G. L.
Gulland,
M.D.,
F.R.C.P.E.

4811. (Professor Allbutt.) You are going to speak to us about your Edinburgh experience?—Yes. Since I wrote my *précis* I have gone over a great deal of clinical material and notes, and have much more to say about the matter. I have been physician to the Victoria Hospital for the last 10 years or so. We have got an hospital where the phthisical cases are taken in and treated, and then there is in addition a very large out-patient dispensary.

4812. It is the same kind of hospital as the hospital of Brompton?—Yes. I have seen probably about two-thirds of the out-patients during the last 10 years, and for the last four or five years about one-third of the in-patients. I began by taking the histories of the in-patients.

4813. You might tell us in the first instance what

occupations there are in Edinburgh or the districts from which your patients are drawn which involve the inhalation of gritty dust?—Well, I confined myself to masons altogether; I was asked to speak in regard to masons, and I confined myself to them. I began with the in-patients. I took a large number of cases at random, but I found that all of these had tubercle bacilli in their sputum. I understood the gist of the inquiry would be as to whether the cases were tubercular or not, and I found that all had tubercle bacilli in their sputum. I thought that would be of probable value from a discriminating point of view, so that I have simply taken about a dozen or thirteen cases at random and put down a sort of *précis* of their history.

4814. These are all stonemasons?—Yes. The only point that came out as regards the hospital cases is that

they did not improve so much under treatment as the average non-gritty case, and that all of them had a comparatively long duration before they came into hospital. Then I took up the out-patients, and I have tabulated all the masons coming up in the last three years without exception. My reason for taking the last three years was that before that time the sputum was only examined in doubtful cases for diagnosis and not as a routine. About three years ago the City of Edinburgh instituted voluntary notification of phthisis, and the sputum has been regularly examined with a view to that since that time. Some of the cases in my table were not examined, and the reasons for that were various, sometimes because they were country cases where the patient simply came up to town for a day and went away again, and sometimes patients who would not bring up their sputum or from whom the nurse who is regularly sent to oversee the patients could not get it, or again they were cases sent up by doctors for an opinion or cases for admission to hospital. That explains the fact that a good many of them were not examined. At least 17 of the unexamined cases were quite definitely tubercular, I should say. The total number of these cases is 53. Of these, two were not cases of phthisis; one was a heart case, and the other was a case of a syphilitic lung. That makes 51. Of the 51 cases the sputum was examined in 29 cases, and in 27 of these cases tubercle bacilli were found in varying numbers. The table gives the actual number, at least the approximate number. Then of the two cases where the sputum was examined and tubercle bacilli were not found one was a very early apical case where they would not probably have been found in any case, and the other a case with a great deal of bronchitis, and of course in such cases it is very usual that bacilli are often not found, or only found after repeated examination. My impression on going over the cases which I have tabulated is that at least 17 of the unexamined cases were quite definitely tubercular—judging from temperature, history, and general symptoms, such as loss of weight, physical signs, and so on—and possibly a larger number may have been.

4815. You mean primarily tuberculous?—I do not say primarily tuberculous.

4816. But infected with tubercle?—Yes, that is the better way to put it. I was struck by the preponderance of hewers—that is to say, actual stone-cutters. The cases have always been divided at the dispensary into builders and hewers, and of the whole 53 cases six only were builders, one a builder and hewer. Of course when masons are brought up in the country they very often have to do both parts of the work. This certainly does not correspond to the proportions engaged in the trade, of course.

4817. What does the hewer do; is it very fine stone-dressing?—I think in most cases it is both fine and coarse.

4818. What do you consider to be the injurious part of the work—the injurious way in which he does it?—Well, I think partly the cramped position, and partly the fact that he is doing it in sheds where the dust is allowed to accumulate.

4819. This kind of hewing he does chips off very small particles?—Yes, and it is believed that the Edinburgh stone is worse in that respect than any other, because it is a fine freestone and gives off a very dusty grit. Then I went into the question of ages—I thought that might be of importance, too. The youngest case was 18, but he had already been treated for chest mischief in the Sick Children's Hospital as a boy, and he was already an advanced case when he came under observation. He could not have done very much hewing at 18, so that might be eliminated. The remaining 50 cases, according to ages, are as follows:—20 to 30, eight cases; 30 to 40, nine cases; 40 to 50, eighteen cases; 50 to 60, eleven cases; and over 60, four cases; so that from 40 to 50 and from 50 to 60 are the two highest figures. Then the question of duration of illness came up before patients appeared at the dispensary, and I found that they varied too much to admit of very useful tabulation.

4820. How did you try to ascertain duration?—That is regularly done in our case sheets. I brought some of our case sheets here to show how it is done. We take the patient's age, height, weight, temperature, previous health, family history, coughing, and so on. Then the physical signs are marked in according to a system which we have elaborated. By duration I mean duration of symptoms.

4821. The patient would be asked how long he had a cough?—Yes, how long he had felt ill. Of course that does not go for a very great deal. I found that 28 of the cases had felt ill for a year or over, some considerably over; I mean there were some cases which felt ill for several years—four years, three years, and so on.

4822. Have you any reason to suppose that those men would ignore a very large part of the initiatory stage of this condition?—I think so, because if you compare the two tables of duration of illness and the time off work sometimes you will find a man has been ill for four years and he has been off work two weeks, and it is quite usual to find that they have not sought medical advice at all before coming to the dispensary.

4823. And there would be a long period when they did not even trouble themselves about it?—Yes. Then the next point that I took up was family history, and it is rather curious that the family histories are so good of the whole 64 cases, including the in-patients; there is a history of phthisis in the family in only 11 cases.

4824. They come of families employed out of doors?—Not necessarily; it does not absolutely follow. That is not noted; but in one case it is noted that the father was a mason.

4825. Persons engaged in outdoor pursuits are less subject to phthisis?—Yes. As I have already said, there was only history of phthisis in the family in 11 cases, and a possible history of infection from a family friend in another. Of course these histories are not always to be relied upon.

4826. It applies probably to their very immediate relations?—Yes, and not always in these cases are they accurate. Then another point was temperature. In the list of the cases there is noted which cases had a temperature when they came up; all the others which are not noted are normal.

4827. Then you rather agree with the previous witnesses that there is a great persistence of normal temperature among those people?—That is true to a certain extent, but if you take the ordinary run of cases that come up at the dispensary it is astonishing how different the temperature is.

4828. I suppose many of them walk to the place?—Yes.

4829. That does not raise their temperature?—Very often it does not raise their temperature. Of course it is only the less acute cases which come up. Then as regards the symptoms and physical signs, the only common point really among all the cases is that they have a rather gradual onset and a rather long and chronic course. I think if I were to take 50 cases at random from another occupation than that I should have found a rather shorter course before they sought advice, and probably a more acute onset. That is my impression, judging from the cases I have seen. I heard what Dr. Muir said as to physical signs, but I am very doubtful indeed whether you could draw any real deduction from these as to the question whether a man was tubercular or not.

4830. By that you mean whether he is permanently tuberculous?—Yes.

4831. You are speaking entirely all this time of the consumption hospital?—All those Edinburgh cases.

4832. I suppose that a man diagnoses himself to be consumptive before he comes to your hospital?—He considers that he is suffering from some chief disease.

4833. A man who considered himself to be suffering from an old wheezy cough and so on would go to the general hospital?—No, they very often come to us. There is a little difference in that way between the in-patients in the hospital and the out-patients. The in-patients are all tubercular, that part of it is a hospital for consumption alone, but the out-patients have any kind of chest ailment.

4834. Then there is no selecting process?—No. I noted the point that masons are not immune to ordinary phthisis, and some of the cases may be due to that, and so on.

4835. (Dr. Legge.) What is the distinction you draw between a hewer and a builder?—It so happens that in those in-patient cases the distinction has not been made. Some of them are simply noted as mason, without stating whether it is builder or hewer, but in the case of the out-patients they are all discriminated. The in-patients were cases taken from some time back, and I could not get hold of anything more definite. Then

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there is the further point that cases are probably not infected at their work with tubercle, but most likely in their own homes or elsewhere, and then there is the other point which Dr. Muir also drew attention to. In most of the earlier works on the subject it used to be stated that grit phthisis was a basal phthisis, began at the base of the lung, but that is not the case certainly as regards these cases; these cases are practically all apical. A fair number of them, of course, are basal as well, but there is always the apical mischief to begin with; I have not found a single case in this lot where there is basal mischief alone.

4836. (*Professor Allbutt.*) Can you tell us into what part of the lung you think the grit is inhaled?—I should fancy it is very much the same thing as with ordinary phthisis; it is subject to the same rules; I do not fancy the tubercular dust differs in that respect from ordinary dust.

4837. Where the one goes the other goes?—Yes.

4838. The same diffusion would cover both?—Yes.

4839. The mere gravity of the particles would not make much difference, the mere weight of the particles I mean?—No. I need not say anything about the pathology, because Dr. Muir went into that very fully.

4840. Then it appears that you would rather put it in this way, that every case of chronic phthisis of the kind we are speaking of, of stonemasons, is a combination of mechanical irritation and tubercle?—It looks pretty like it. I started with the kind of impression that I should find that probably about half of them were, and here there are 29 cases, 27 examined and found to be tubercular, and they are by no means all the most advanced cases; for instance, tubercle bacilli were found in a lot of early cases.

4841. Do you think that the quantity of tubercle bacilli in the sputum is of much importance, whether there are very few or very many, as a diagnostic point I mean?—Of no importance. I do not think that very much matters, because it is so often a question of whether a focus has recently been opened into or whether there happens to be a great deal of bronchitis to dilute the sputum. It depends on a great many factors of that kind; if you find tubercle in the sputum that is quite enough.

4842. The question is, which is the predominant partner?—Yes.

4843. The mechanical irritation or the tubercle?—Yes.

4844. In the case of those stone hewers, is it as a matter of proportion that, say, in 80 or 90 per cent. of cases you would be able to form a fairly good presumption as to whether it was in the main of mechanical origin or tuberculous origin?—Well, I do not think you could frankly, because I could take these cases as regards the physical signs and parallel them by 50 other cases taken almost at random.

4845. You have every reason to suppose that what you have said would probably apply to other ways of getting dust?—Yes.

4846. You would expect to give us the same answers if you were examined in regard to grinders?—Yes, I should think it would be extremely difficult to distinguish between the two. Of course, if you had a case of fibroid mischief, in which you found dust of one kind or another in the sputum, and over a certain period found no tubercle bacilli, I think you would be entitled to regard that as grit phthisis alone. My feeling is this as regards the question of compensation: that if you make such cases as these subjects for workmen's compensation, you are going to penalise the employer for the habits of his employee at home and for his family history, for his surroundings, and so on.

4847. But at the same time you are strongly of opinion of the occupation is very largely concerned in the result?—Oh, yes.

4848. Although you cannot help us to establish a working criterion?—I think the working criterion is going to be extremely difficult.

4849. Supposing that I suggest to you that a man had been employed in his work twenty years, that for the first ten years he had not felt anything very much, but perhaps would admit that he was getting rather short of breath; supposing the shortness of breath and cough increased upon him to a considerable extent, so much so that he had been to his own doctor, and that though his own doctor found very little physical signs to account for the cough, that when he came under

your care you inferred a very large amount of fibrosis, that would be a strong presumption that the case was due mainly to employment?—Undoubtedly.

4850. The question is whether there are many such cases, or whether you think that of fifty people claiming compensation there would only be of that fairly obvious kind a certain small proportion?—A small proportion I should think only.

4851. A great many others would be common phthisis?—Yes. In going over these cases, and laying aside the early ones, where one would not expect to get cavity under any conditions, or very demonstrable signs of cavity, an enormous number have signs of cavity; that is to say, not a pure fibroid thing, but an apical cavity, such as you get in ordinary cases of tubercle. I now refer to a case of a hewer with phthisis, where there was marked dulness and flattening down the side, etc.

4852. The difficulty would not be so much that of determining that in a certain number of cases compensation was due, for there would be a large number of cases where it certainly was due, but in picking them out?—Yes.

4853. (*Dr. Legge.*) The remark I would make with regard to the case you have referred to is that the patient was 30 years of age, and there was a duration of nine months, and therefore his employment as a hewer could not have been very long?—He would begin as an apprentice, probably about 14.

4854. We have heard of very few cases of grinders' phthisis where the patients were less than 35 or 36 years of age?—I now refer to a case of a man of 43 years of age of very much the same class. The duration of illness is put in as two months, but that is obviously absurd.

4855. Have you any cases where the age is greater, say over 40, where you have these marked symptoms?—Yes, here is one of 43 with tubercle bacilli present.

4856. You have not got down the duration of employment here?—No, these statistics were not, of course, taken with a view to this inquiry, and I do not suppose one could get these particulars.

4857. But still that is an item which would have to be considered in every case where the question arose?—Yes. Here is another case of 45 with low bronchial breathing at both apices and the same behind, and another of 52 with low bronchial breathing, another of 35 with marked flattening of both sides, with cavities and so on. Here is one of 37, and here is another one of 50 with low bronchial breathing, etc., and here is another of 48, the same thing, with marked dulness and flattening down the side.

4858. (*Professor Allbutt.*) Don't you see cases in which there are rather advanced complaints, and yet very inadequate physical signs?—It is rather the other way. Our workmen in Edinburgh seem to go on working until they drop; it is the commonest thing in the world to find a man come up with that sort of thing, not only stonemasons, with lungs absolutely riddled with cavities, and to find he is working.

4859. (*Dr. Legge.*) I suggest that possibly the medical man practising in the districts where these men live is perhaps more likely to come across the early condition than you are at the general hospital?—I do not think so. One's experience is that the early cases are very seldom made out.

4860. We had giving evidence before us yesterday, in Wolverhampton, the doctor of a club composed of grinders in a large metal-grinding shop—and he was quite satisfied himself that he could?—He would be less likely to be alive to it in a place like Edinburgh, where there is not a great deal of that sort of thing. I do not think the masons have a society of their own; they generally belong to Oddfellows, Foresters, or something of that sort, and are scattered up among different doctors, and I do not think one would find that the doctors would necessarily make out very early cases. Of course, if a man came as a mason to them for an opinion, possibly they would suspect it was a case of masons' phthisis, but they might find it difficult to substantiate their opinions by actual physical signs.

4861. (*Professor Allbutt.*) You made an allusion to the somewhat fixed attitude of the stonehewer, in which he bends down to his work, keeping his chest more or less rigid, which rather reminds me of what was said by Dr. Glaister. He spoke of the same thing in regard to the grinders: that in handling the article

they held their chest in an even more rigid attitude?—Yes.

4862. And he thought that the respiratory condition of these men was very likely due rather to the fixation of the chest than to any pulmonary deterioration. That, of course, might be only a suspicion, but you made some allusion yourself to the same thing?—Yes; it does not hold with the hewer to quite the same extent as with grinders, because their position is not so absolutely fixed; they are moving about more.

4863. Do you think that fixation of the chest would render them more liable to tuberculosis?—I think anything which interferes with the movement of the chest certainly would do so, and to that extent it certainly would, but I think it is hardly necessary to go so far, because you have got the actual work of the stone, the stone dust.

4864. But supposing that we take the tubercular element into the case, that originally the chest contracted tuberculosis independently of the grit part of the business, we might still be approaching the question of a trade disease, perhaps at a distance, but still approaching it?—Yes.

4865. I suppose you have no information to enable you to know the proportion of phthisical hewers?—I have not particulars of that.

4866. Could you get it for us?—It would be very difficult to get. I might get the phthisical incidence in stonehewers in Edinburgh; I could easily get the actual phthisis mortality among stonehewers.

4867. Could you get the whole number of stonehewers?—No.

4868. Do they inhabit a certain quarter?—No, they live all over the town.

4869. Then it would not perhaps be sufficient to get the phthisical statistics of a certain quarter of the town?—I do not think that at all, because in Edinburgh, for instance, there are a great many districts where workmen live, and they are scattered pretty well all over the town, and these men very often live near their work, and if there was a new quarter being built they are apt to move and go to it.

4870. They know it is an unhealthy occupation?—They talk of this as masons' trouble always.

4871. Does that lead them to take drink through despair, or anything of that kind?—No.

4872. They are quite cheerful about it?—Yes.

4873. They do not drink any more than other people?—No, I think they are a very steady lot, as far as I know them.

4874. I think there is another way possibly in which you might get some information of the kind if you happened to be acquainted with any contractors who could say whether they have a very fair average of men working in health between 40 and 60 years of age?—Yes, it so happens I do know some of the large builders.

4875. And the men may break away about 50?—Yes, I could do that for you.

4876. 35 to 50 is their worst age?—I think so.

4877. That is rather a late incidence, isn't it, for tuberculous phthisis; but not so late as to make it definitely attributable to the employment?—No. Of course I know quite well that there is an impression that phthisis is a disease of young people, but that is not so; perhaps it is a little late, on the whole.

4878. You consider that it is a late development?—Yes. I could get that from our statistics quite easily.

4879. (*Dr. Legge.*) You pass over altogether the pathological condition, but you get the opportunity, I suppose, at the hospital, to make post-mortem examinations frequently?—Occasionally.

4880. And the description Professor Muir gives is what you find in those stonemasons?—Yes, I think so.

4881. Do you know how this sickness is met now amongst the men—I mean what method there is of pensioning them off?—I do not know how it is done. I have no information about that.

4882. (*Professor Allbutt.*) You will find that out for us, if there is a benefit society?—Yes, my impression is that there is not in Edinburgh. At any rate, my impression is that they are scattered among their own benefit societies—Foresters, Oddfellows, and all the rest, and they come on the rates, and so on.

4883. (*Dr. Legge.*) It is possible that the Foresters may refuse to insure them, as they do refuse to insure workers in dangerous trades, because of the danger of their employment, or demand a higher premium?—I can find out if there is any masons' society in Edinburgh, whether a higher premium is required, or whether they refuse to insure.

4884. These stonemasons are employed by some contractor; they are not their own masters?—No, in most cases they are in the employment of fairly large building firms.

4885. (*Professor Allbutt.*) We have not asked you anything about the prevention?—That is a very wide subject.

4886. Could there be a stream of water thrown over their stones, or could they wear respirators?—I doubt whether a stream of water could in all cases be carried out, it would not be very easy where there was a large building going up. It might be done, of course. That certainly would help, and I fancy if the men would wear respirators on their mouth and nose it would help very much, but the class of men from whom these hewers are drawn is not, as a rule, very intelligent.

4887. But still, if experts said that respirators were necessary to prevent consumption they could scarcely ask for compensation if they declined to use them?—That is so.

4888. This is a new subject; you have not thought about it?—I have thought about it a good deal. Then, of course, there is the other point that if you go into a place where a building is going on and look at the temporary sheds which they have there, you find that the dust is not swept up from day to day; there is no attempt made in most cases. I am talking of the average. You find that they are very dusty, that the dust is stirred up by the men's feet as they work, and the dust hangs on the tables.

4889. A fan might be put up, might it not?—I do not know. That might help, of course, to a certain extent, but with the men chipping the dust is actually flying up at the moment, and they are very temporary sheds they have.

4890. (*Dr. Legge.*) The one is constantly being evolved and the other is only stirred up when they move?—Yes, or when there happens to be wind. Of course, all the sheds are open to the wind.

4891. (*Professor Allbutt.*) There is atmospheric suspension?—Yes, there is a good deal of atmospheric suspension.

4892. (*Dr. Legge.*) I have heard it said that the granite workers do not suffer?—That is said.

4893. You have heard the same thing?—Yes, it is supposed not to be nearly so common in Aberdeen or where they work with hard stones of the same kind as granite, hard coarse stones. Edinburgh, for instance, has always had the worst reputation since the subject was first touched.

4894. (*Chairman.*) I am not sure that I understand this table here. We have got a list of all masons who were affected with phthisis during the last three years?—No, all masons who appeared.

4895. Of all kinds?—Yes.

4896. Then it appears that a great many of these have got phthisis—I mean either tubercular or some other kind of phthisis?—Practically the whole. I think there are only two who have not phthisis of one sort or another. Of course, you must remember this is a chest dispensary purely.

4897. That is to say, it is limited to what diseases?—To phthisis and bronchitis; heart cases turn up also.

4898. If we take some other trade, not that of stonemason, but some totally different trade that was not liable to grit phthisis, we would not find such a tremendous proportion of phthisis in that trade as we do here. Can you name to me another trade that comes a good deal to your hospital; take a trade that is not much connected with gritty dust?—For instance, there are rubber works.

4899. India-rubber works?—Yes, there are large rubber factories in Edinburgh.

4900. Supposing that we had got an equal number of india-rubber workers, should we find such a large proportion of phthisical people among them as we find among masons?—No, I think you would find that a good many of them came up for some trivial thing.

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4901. That is an indication, at all events, that a good deal of this must be industrial?—I cannot be absolutely sure about that.

4902. Supposing you were asked this question, and were compelled to answer it one way or the other, whether you liked it or not, how many of these people would you put down, what proportion—I do not say this or that particular man—but what proportion of these cases do you think is due partly or wholly to the industrial condition—what percentage?—I should think probably a quarter of the cases in the table are not.

4903. A quarter would have got it in any case?—Under any other conditions. I am perfectly willing to admit that the stone has a great deal to do with it.

4904. These are not all your examinations, I suppose?—No, I should say about half of them are mine.

4905. Supposing you had examined those cases and they had been ticked off as Workmen's Compensation Act cases, or not Workmen's Compensation Act cases, supposing it had been necessary to do that, do you think that the quarter that are clearly not Workmen's Compensation cases could have been ticked off with some degree of accuracy? If you had all those cases to look over again before you now, and could go through them, bearing in mind your opinion that probably about a quarter of them ought not to receive compensation, do you think you could have distinguished them pretty well?—I think that would be pretty difficult. May I put it in this way, that in a very large number of the cases the grit is at the bottom of the phthisical process in the lung, that it is the starting-point, but I should fancy that the tubercle comes in very early in the great majority of cases, that the secondary infection is much earlier than you would gather from the textbooks on the subject.

4906. Yes, but I was asking you a question more from a general point of view. Would you have been able to pretty well tick off the three-quarters that ought to be considered as industrial, and distinguish them from the quarter that ought to have been considered as non-industrial?—Yes, I think one could probably in individual cases get at a kind of notion. Of course, I fancy one would always be inclined to lean to mercy's side, I mean for the workman.

4907. Apart from that, take a man who was not leaning to mercy's side, but who was exercising his judgment as fairly as he could, the question is not what his failing in judgment might be, but whether, upon the whole, he could do substantial justice between the employer and the workman; because, of course, it is hard on the employer that a man who has not caught a trade disease has to be compensated, on the other hand, of course, it is equally hard on the workman to receive no compensation if the disease he has contracted is really a trade disease. One has got to do as a judge has to do every day in the courts, not ideal justice, but the best justice one can. The question is, whether you would pronounce it impossible to do, on the whole, substantial justice, or do you think that a tolerably fair attempt could be made which would not be upon the whole unjust, supposing that you had every information that you were likely to get, and a further right to interrogate the workman and to compel him to answer every question which you chose to ask—you must assume that you had the powers of a judge—assuming too that you could compel him to go into his whole history, and that any question which you chose to ask had got to be answered by both parties?—And that one was entitled to examine his sputum on every occasion?

4908. Yes, assuming that you had authority to do anything you liked and get any information that was available, and to compel any and every person to answer?—I think in that case one could do it in a fair proportion of cases.

4909. If so, and if it is admitted that a large number of these cases are industrial cases, and there is no insuperable difficulty of administration, that ought to make us not hesitate to put phthisis down as an industrial disease. At least that seems to follow from your answer, that tolerable justice could be done?—Yes; of course, it depends very much on what view you take of the ground on which workmen's compensation is to be given. That, I think, is the real difficulty.

4910. One would say that a man should be compensated where the disease is entirely or in the main caused by the occupation—I am putting it now a little differently—where, upon the whole, you would

have said that but for that occupation the probability is that the man would have gone through life without phthisis, or that he would have had such a slight touch as would not incapacitate him—put it another way, where his incapacity was due to the occupation?—Well, if you put it in that way, I think one must say that you could probably do justice, because you would always have at the back of your mind the knowledge that the man's lungs had been irritated by the occupation. I now take a case at random of a young man of 20 years of age, and I say that is not a compensation case. My reasons for saying that that is not a compensation case are the boy's age, the fact that it is evidently old standing mischief, in all probability it had been going on for a considerable length of time, and he has not been at the trade long enough. I now take another case at random, where the age is 37. That, I should think, would be a compensation case, provided the man had been a sufficient number of years a mason.

4911. But you would have a right, I am supposing, of inquiring minutely from him every place he had been to, where he had worked and all other particulars, and you would have ample time to do it; it would be a business which would have to be thoroughly gone into?—I think one could say in that case that it was possible.

4912. Then it looks to me as if the Act, though difficult to administer, would be administratively possible; it would be possible to administer this Act; the doctors would be acting chiefly between the insurance companies and the men really?—Yes, that would be so.

4913. With an arbitrator besides?—Yes.

4914. I am proposing the most skilful arbitrator in those matters that you could get in Scotland being called in in cases where there was a serious dispute?—Yes, quite.

4915. I mean if the two parties were not content with the decision of the first man there would be the power to have an arbitrator, the best man that could be got; it looks to me as if it would be possible to administer this?—Well, yes, if you put it in that way.

4916. That is the way I wish to put it?—The thing that occurred to me originally was that you were going to have very considerable difficulty with the complication of the tubercle bacilli, but if you put it like that I think it is feasible.

4917. What do you mean by "cause"; I suppose an arbitrator could give a commonsense interpretation of the word cause that would, upon the whole, cause justice to be done, a fairly rough justice between the men and their masters and the insurance companies, the intention being to compensate people who had been injured by the disease?—Yes, quite.

4918. You would agree to the possibility of that?—Yes, I think it would be possible.

4919. One of the gentlemen called before us said that in the case of phthisis that was caused by dust there would not be a rise of temperature; it is not sufficiently distinctive to be a real criterion?—No, some of these cases have temperature.

4920. (Professor Albutt.) With regard to the question of a referee in cases of this kind, I suppose it might be that medical men who are continually practising among these people might collect some information, and be able to formulate some difference between the cases in which compensation would be payable and those in which it would not be payable?—Well, I am doubtful whether you would take the question of compensation so much on the actual physical signs as on the history.

4921. To differentiate between cases which are chiefly due to occupation or chiefly to other conditions?—I think that would be rather a question of history than of physical signs. I do not think that you could on the physical signs; but taking those two cases I took, I would have made one a compensation case on the history practically and the other non-compensation. Of course, you would have to make out first of all that the man had definite changes in his lungs.

4922. (Chairman.) With regard to those cases where compensation was to be paid upon death, after the death there would be less difficulty than ever, where you could get an examination of the lung?—Yes.

4923. Do you think that, if you had the full history of the case, the matter would present no great diffi-

culty?—After death I think practically no difficulty at all, provided you were able to make a post-mortem.

4924. (*Dr. Legge.*) I have seen that some of the workers who attend as out-patients at the Royal Infirmary at Edinburgh are put down as suffering from rubber workers' anæmia; have you any knowledge of what is meant by that?—Not as an actual entity, I think. A good many of them are anæmic; of course a great many of them are chlorotic girls.

4925. At the precise age that they would be chlorotic in any case?—Yes, and some of the men are anæmic. I remember thinking about that the other day. I was trying to find out for myself which particular branch or whether it had any particular connection with any particular branch of the work, but I could not make it out. Of course there used to be a good deal of bisulphide of carbon, and so on.

4926. Which is not used at all now?—I saw a good many cases of that kind at one time, but I do not think anyone can differentiate any special anæmia.

4927. (*Chairman.*) I suppose there is no method of using Rontgen rays or anything of that kind by which you can tell the difference between an industrial case of phthisis and the other; you could not see anything?—No, you could not; my experience of Rontgen rays in the way of examining chest conditions is distinctly disappointing. At one time one of my assistants at the Victoria Infirmary was very much interested in the question of X-ray diagnosis, and we took a series of cases, twenty or thirty. I marked out the physical signs as I thought them from ordinary examination, and he X-rayed them, and I think we found, generally speaking, that I was nearer the probable mark.

4928. There is one thing I suppose we might say; if it became necessary to make this discrimination in the case of masons and grinders and other people, no doubt if medical science had its attention directly turned to this point, if the whole attention of the practitioners in Scotland was directed upon it, it would result in a better means of discrimination probably than we possess at present, the science of discriminating between industrial phthisis and ordinary phthisis would very much improve by practice?—I do not think you may put it in that way; I do not think you can actually discriminate between industrial phthisis and the other phthisis.

4929. I will say then, discriminate between cases that ought to be compensated and those that ought not?—I think you could do that.

4930. Practice would make it more perfect?—I think it is more a question of history than of physical signs. Grit gives rise to bronchial catarrh, it gives rise to fibrous tissue, it wounds the walls, and tubercle bacilli get a more ready entrance.

4931. (*Professor Albutt.*) It depends on the individual proclivity how fast it goes?—Yes.

The witness has since forwarded to the Secretary the following additional evidence, which he desires to lay before the Committee:—

ADDITIONAL EVIDENCE.

A certain amount of statistics asked for by the Committee I have not been able to get, for I find that the secretaries of the Friendly Societies in Edinburgh are not very good at answering letters. I have ascertained, however, that no extra premium is demanded from masons insuring in these. I have found it impossible also to get any trustworthy statistics of the number of masons employed in Edinburgh, or of those infected with chest disease. I think this can only be done by someone possessing Government powers to get information.

With regard to additional facts from the Victoria Hospital, the following may be of interest:—The total number of patients who attended the out-patient department up to the 31st March, 1906, was 15,452 individual cases. Of these 575 are masons. This number is nearly approached by the carpenters and joiners, who number 495, clerks, etc., 477, and surpassed by labourers 1,021, domestic servants 597, and enormously by housewives, 5,149. I enclose a portion of the report bearing upon this. Table 4, which shows the ages of those patients, indicates that while the decades most affected among masons are from 30 to 40, and from 40 to 50, the decade showing the highest incidence among the general patients is from 20 to 30, so that the incidence among masons is apparently a late one.

II. OUT-PATIENT DEPARTMENT.

Up to 31st March, 1906, 15,452 individual cases received treatment at the out-patient department.

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TABLE I.—Showing attendances from 31st March, 1905, 16 Jan. 1907, till 31st March, 1906.

| | At Institution. | At their own Homes. | Total. |
|-----------------|-----------------|---------------------|--------|
| April - - - | 1,169 | 159 | 1,328 |
| May - - - | 1,291 | 152 | 1,443 |
| June - - - | 1,267 | 149 | 1,416 |
| July - - - | 1,115 | 107 | 1,222 |
| August - - - | 1,301 | 146 | 1,447 |
| September - - - | 1,075 | 120 | 1,195 |
| October - - - | 1,157 | 112 | 1,269 |
| November - - - | 982 | 169 | 1,151 |
| December - - - | 1,120 | 159 | 1,279 |
| January - - - | 1,230 | 159 | 1,389 |
| February - - - | 1,143 | 145 | 1,288 |
| March - - - | 1,424 | 173 | 1,597 |
| | 14,274 | 1,750 | 16,024 |

Visits paid by nurse - - - 1,545
Number of sputa examined - - - 389

TABLE II.—Showing Diseases from which Patients Suffered.

| | |
|--|--------|
| Pulmonary tuberculosis - - - | 10,824 |
| Bronchitis - - - | 1,406 |
| Emphysema, with bronchitis, asthma, etc. - - - | 617 |
| Œdema of lungs, with or without bronchitis, weak heart, etc. - - - | 341 |
| Capillary bronchitis - - - | 20 |
| Injury to chest and hernia of lungs - - - | 11 |
| Croupous pneumonia - - - | 14 |
| Pleura, affections of - - - | 291 |
| Larynx, affections of - - - | 245 |
| Affections of related organs, etc. - - - | 1,683 |
| | 15,452 |

TABLE III.—Showing Occupations of Patients.

| | |
|--|-------|
| Artists - - - | 29 |
| Athletes - - - | 3 |
| Bakers - - - | 156 |
| Blacksmiths - - - | 113 |
| Bookbinders and folders - - - | 217 |
| Brassfinishers - - - | 104 |
| Butchers - - - | 59 |
| Cabmen and grooms - - - | 139 |
| Carpenters, joiners, and woodworkers - - - | 495 |
| Car conductors and drivers - - - | 12 |
| Charwomen - - - | 143 |
| Chemists - - - | 24 |
| Children (below fifteen) - - - | 1,749 |
| Chimney sweeps - - - | 7 |
| Clerks and warehousemen - - - | 477 |
| Coal miners and workers - - - | 156 |
| Comb and brush makers - - - | 24 |
| Confectioners - - - | 23 |
| Coopers - - - | 8 |
| Corkcutters - - - | 16 |
| Dairymen - - - | 10 |
| Domestic servants - - - | 597 |
| Engineers and enginemen - - - | 253 |
| Farm servants - - - | 32 |
| Firemen - - - | 43 |
| Fishermen and sailors - - - | 72 |
| Fishwomen - - - | 48 |
| Fitters and riveters - - - | 58 |
| Gardeners and farmers - - - | 69 |
| Gatekeepers and messengers - - - | 84 |
| Glasscutters and grinders - - - | 38 |
| Glaziers and gilders - - - | 27 |
| Golf-club makers - - - | 4 |
| Grocers - - - | 92 |
| Guards - - - | 27 |
| Gunmakers - - - | 11 |
| Hairdressers - - - | 61 |
| Hawkers - - - | 110 |
| Hosiery workers - - - | 6 |
| Housewives - - - | 5,149 |
| Insurance agents and commercial travellers - - - | 156 |
| Ironmongers and typefounders - - - | 148 |

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| | | | | |
|------------------------------|---|---|---|--------|
| Jewellers and watchmakers | - | - | - | 49 |
| Labourers | - | - | - | 1,021 |
| Laundresses | - | - | - | 117 |
| Leather workers | - | - | - | 16 |
| Librarians | - | - | - | 2 |
| Lithographers | - | - | - | 33 |
| Lorrymen and carters | - | - | - | 158 |
| Maltmen | - | - | - | 41 |
| Masons | - | - | - | 575 |
| Millworkers | - | - | - | 301 |
| Musicians | - | - | - | 21 |
| Nondescript | - | - | - | 885 |
| Opticians | - | - | - | 2 |
| Paper bag makers | - | - | - | 59 |
| Paper cutters | - | - | - | 54 |
| Painters | - | - | - | 149 |
| Plasterers | - | - | - | 49 |
| Plumbers | - | - | - | 88 |
| Policemen and watchmen | - | - | - | 34 |
| Porters | - | - | - | 146 |
| Postmen, lamplighters, etc. | - | - | - | 39 |
| Printers, compositors, etc. | - | - | - | 380 |
| Railway servants | - | - | - | 65 |
| Riggers | - | - | - | 4 |
| Rubber workers | - | - | - | 251 |
| Salesmen | - | - | - | 213 |
| Saleswomen | - | - | - | 242 |
| Scavengers | - | - | - | 17 |
| Sealing-wax maker | - | - | - | 1 |
| Seamstresses and dressmakers | - | - | - | 325 |
| Shoemakers | - | - | - | 146 |
| Sick nurses | - | - | - | 49 |
| Slaters | - | - | - | 38 |
| Soldiers | - | - | - | 37 |
| Spinners | - | - | - | 10 |
| Stokers | - | - | - | 16 |
| Students | - | - | - | 16 |
| Surveyors | - | - | - | 4 |
| Tailors and hatters | - | - | - | 316 |
| Tanners and curriers | - | - | - | 27 |
| Teachers | - | - | - | 72 |
| Tinworkers | - | - | - | 62 |
| Upholsterers | - | - | - | 41 |
| Van drivers | - | - | - | 18 |
| Vulcanite workers | - | - | - | 8 |
| Waiters | - | - | - | 140 |
| Weavers | - | - | - | 42 |
| Wireworkers | - | - | - | 26 |
| | | | | 15,452 |

TABLE IV.—Showing Ages of Patients.

| | | | | | |
|-----------|---|---|---|---|--------|
| From—1-10 | - | - | - | - | 1,105 |
| „ 11-20 | - | - | - | - | 3,321 |
| „ 21-30 | - | - | - | - | 4,438 |
| „ 31-40 | - | - | - | - | 3,145 |
| „ 41-50 | - | - | - | - | 1,916 |
| „ 51-60 | - | - | - | - | 962 |
| Above 60 | - | - | - | - | 565 |
| | | | | | 15,452 |

TABLE V.—Showing Sex of Patients.

| | | | | | |
|---------|---|---|---|---|--------|
| Males | - | - | - | - | 8,416 |
| Females | - | - | - | - | 7,036 |
| | | | | | 15,452 |

The incidence of mortality among masons is worked out fully in Dr. J. C. Dunlop's "Supplement to the Forty-eighth Annual Report of the Registrar-General in Scotland," 1905. I would refer to pp. 37, 69, 127, 133, and 135 in particular. The report is very valuable,

Mr. ANDREW LEES BELL, M.D., D.P.H., called and examined.

Mr. A. L.
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4932. (Chairman.) You are in practice in Glasgow?—I am in practice in Dunfermline, the industrial capital of Fife.

4932.* You propose to give us evidence regarding the diseases to which miners are liable?—Yes.

4933. I suppose that it is coal-mining that you are going to deal with?—Yes.

4934. Exclusively coal-miners?—Yes, exclusively coal-miners.

inasmuch as it contains not only the Scottish studies, but abstracts of previous English and foreign ones. The group of builders, masons, and bricklayers is found to have in both age periods (25-45 and 45-65) death rates higher than those of "all males." Death rates from tubercule, pneumonia, and bronchitis are high. Thus the "all males" death rate from tubercule is 267 per 100,000, that of this trade group 586; from pneumonia, the "all males" 165, masons 213; from bronchitis, the "all males" 99, masons 186.

Judging from these death rates my estimate in answer to Question 4902, that a quarter of the masons would in any case have taken phthisis, is probably too low, a half would be more nearly accurate.

With regard to the general question whether phthisis in masons should be made a subject of compensation, the following conditions suggest themselves to me. In all probability the Committee has already entertained them also, but I feel it right to allude to them.

Judging from my experience, and from the statistics which I have quoted, it may be assumed as practically certain that all cases of masons' phthisis are tubercular sooner or later, and that in all probability the tubercular infection occurs early in the condition, and is responsible for most of the destructive changes in the lungs. If that be assumed, it follows that a great many other factors besides the occupation are of importance in the condition—family history, general physique, the diseases of childhood, home surroundings, habits as to food, and especially drink, the occurrence of debilitating diseases such as influenza, chronic gastric catarrh, etc., the possibility of infection at home or from sick friends, and many more. These questions do not come into play in regard to ankylostomiasis or anthrax, for instance, or at any rate not nearly to the same extent.

In judging of the suitability of individual cases for compensation during life all these questions will have to be considered, for I have pointed out that physical signs alone do not enable one to say whether stone dust has played a part in causation. Phthisis is a disease of such extreme variability in its course, and often of such long duration, that one might have in a given case to go back five, ten, or more years to find out how it was acquired. Even assuming that a patient desired to give truthful answers, there are few people in the class to which these men belong whose memories are to be trusted over that length of time, and every physician knows how apt patients are to forget, or to conceal, essential facts in their history. Patients in that class, moreover, hardly ever have any idea of the diagnosis that their medical attendant makes of their diseases, and often begin work or continue at it in defiance of advice when they are in a vulnerable condition. How can such a fact be ascertained years afterwards? In the same way men with weak chests or with bad family histories may take up mason work.

It will, in the great majority of cases, be impossible to say at what time the disease started, partly because of the reasons given, partly because of the extremely chronic form that phthisis often assumes, and the fact that it may often be dormant for long periods. The men move about from place to place, and are often employed by many masters in succession. It is obviously absurd and unjust that the master in whose employment the man happens to be at the time when the disease is discovered, incapacitates him from work, or causes death, should pay compensation for a condition contracted years before, under a master who is perhaps dead or not to be traced. It may be said that the liability will fall upon insurance companies. I had at one time a very large experience of employers' liability insurance, and I feel pretty sure that the companies will not be slow to lay hold of a flaw of this kind. The same difficulty will arise if the compensation is delayed until death has occurred.

4935. What coal fields is it; it will be the coal fields immediately round Fife?—Around Dunfermline and in Fife.

4936. You mention among the diseases that you are inviting us to consider, nystagmus, miners' bronchitis, ankylostomiasis, and then in addition to that there are miners' elbow, miners' knee, and beat hand?—Yes.

4937. These are the six?—Yes.

4938. The first thing we might deal with is miners' nystagmus; have you seen cases of that?—Yes, many.

4939. A good many?—Yes.

4940. What are the general features of it?—The oscillation of the eye.

4941. What proportion of men get it out of 100 men?—I should say about three or four.

4942. It is not a widespread disease then?—No, nystagmus is a small thing, and it does not incapacitate materially for the work of coal-mining.

4943. It will incapacitate a man for a few weeks, do you mean—say a week or two, and then he will come back again?—Yes; only in the most severe cases of nystagmus would I say that the man was incapacitated for his work.

4944. Do they come upon the funds of any of the benefit societies for nystagmus at present?—Yes, they come when they are incapacitated from any cause.

4945. But cases of nystagmus are recognised by the benefit societies, and paid for?—If the medical officer signs that they are unfit for work.

4946. It has already been treated by the benefit societies as a recognised cause of disability?—Yes, it is a cause of disability, but not pure and simple; only when it is associated with dimness of vision, and only in the chronic cases—long-standing cases. That is to say, a miner may have it for many years in a moderate form, and yet he may keep at his work without losing a day, but in the aggravated forms of it, where the eye is very badly oscillating and where the optic nerve has become affected and the muscles of the eye weakened very much, then he would stumble at his work, and would be unable to continue at it until he had several weeks' rest.

4947. Then I understand that it is only in the rather aggravated cases that you suggest that compensation should be payable?—Quite.

4948. Not in the merely incipient cases?—No.

4949. It is in the aggravated cases that the miners are asking for compensation?—Yes, long-standing cases.

4950. Are you here on behalf of the Miners' Federation?—Yes; I am sent to give evidence on behalf of the Scottish Miners' Federation.

4951. And therefore you are able to express what their views are?—Yes.

4952. I may put it more strongly, and say that you are here to represent that it is in the severer cases of nystagmus that compensation is really asked for?—Undoubtedly.

4953. As incapacitating for work?—Yes, only the severer cases.

4954. Supposing the Committee were in favour of including the severe cases in the third schedule to the Act; supposing they should arrive at that conclusion after hearing all the evidence, how do you suggest it could be described? You could not write down "nystagmus" simply, because everybody who had a twitch in the eye would come in?—I should say an expert in eye diseases would be required to give a certificate on soul and conscience that the man was unable to do work owing to nystagmus.

4955. We should require to call it severe nystagmus, or something like that?—If it incapacitated him for work it would be severe; only a severe form could incapacitate him.

4956. You are not asking for anything except that compensation is to be given when the man really cannot work?—Yes; and only on expert medical evidence.

4957. We might pass from that for a moment to miners' bronchitis. That is a little more difficult, I suppose?—It is.

4958. Because I might get bronchitis or you might get bronchitis?—Yes.

4959. And then it might be very difficult to say whether we had got it because we were miners or because we were men?—For ordinary people, but not for a doctor who is attending you.

4960. Do you think, as a doctor, that you could so distinguish miners' bronchitis from bronchitis that a miner gets, and which is not miners' bronchitis? Two miners get bronchitis; one of them gets it on account of being a miner, and the other would have got it even though he had been something else. Do you think you could distinguish between the two kinds?—Miners'

bronchitis is chronic, and the ordinary bronchitis is always a temporary affair.

4960*. Not always, is it?—Well, you can have simple bronchitis in anyone. I am taking a man at his work who gets bronchitis from exposure or sudden chill, and he recovers in the course of a few days or a week or so, and there is no trace of the bronchitis left. With miners' bronchitis it continues; it goes on increasing.

4961. To what do you attribute it, to what cause?—It is undoubtedly at any rate in the first instance due to the inhalation of coal dust and the impregnation of the lung tissue with coal dust.

4962. I suppose you would concede that, generally speaking, the miner's occupation, apart from accidents, is one of the healthiest in the country?—It is.

4963. But if that is the case, if we put down, say, miners' bronchitis, should we not be obliged to put down blacksmiths' bronchitis, and everybody's bronchitis. Can you make out a special case for miners as against blacksmiths, engineers, and the hundred other trades that there are in Great Britain?—I do not think I can, except that it is distinguished in symptoms by the expectoration of black spit, and that it goes on to degeneration of the lung in severe cases; but when they suffer with nystagmus it is only an odd case now and again that I had.

4964. Doesn't everybody who blows his nose in a mine soil the handkerchief with which he blows it with black?—Yes, that is in the nose only, but this man coughs and spits it up in the morning when he goes to his work; when he comes out in the morning first he will cough and spit up from his wind tubes this expectoration, impregnated with coal dust, very black, a gritty material which you can feel with your fingers, you can get the particles of coal that have come from the bronchial tubes, and in post-mortem examinations I have frequently seen a miner's lung as black as ink, and when you took the scalpel and divided the lung you could scrape the little particles of coal in the lung tissue, but I must also say that coal dust is not of itself very injurious either to the lung or to an ordinary wound, it is carbon.

4965. It is the silica you mean that is mixed with it?—Yes, and even as it stands with the silica it is not irritating to the lung particularly. There is nothing very injurious about the ordinary coal dust except that it irritates to a certain extent and causes bronchitis, but it does not cause injury the same as steel dust, for instance, or copper dust and so on; there is none of the wasting.

4966. It would be difficult to include in the Third Schedule to the Act bronchitis for miners, seeing it is a healthy occupation, without including bronchitis for everybody all over the kingdom in other occupations?—No, that is so. Among the diseases I was particular about ankylostomiasis, of the three I was particular about it, but I did not know it was in the new Act.

4968. But it is this miners' bronchitis that we are now discussing, and I was asking you whether it was not rather a weak case in some respects, because the miners' bronchitis does not seem to be very much worse, from what one can learn, than the bronchitis all over the country?—Indeed that is so, and I do not make a point of that, except that it is one of the diseases that does belong to miners.

4969. It is one of the diseases that ought to be considered at all events?—Yes.

4970. (Professor Allbutt.) If a miner spits he will probably spit black?—Yes.

4971. (Chairman.) Then with regard to ankylostomiasis, I won't ask you many questions about that, but only this one point. Some time ago I saw Mr. Smillie and asked him if a single case could be discovered anywhere in Scotland to let us know instantly, and we would have a searching investigation made, has any case arrived so far as you know yet?—Yes, there are two from Loanhead in the Edinburgh Infirmary.

4972. When were they found?—Less than a month ago.

4973. He has not let me know then?—He ought to. The two of them were treated in Edinburgh Infirmary, under Dr. James, and he is very enthusiastic about it; it is a new disease to him, and he is giving lectures.

4974. What mine has that occurred in?—From Loanhead, I do not know which mine it is. They are in the Royal Infirmary in Edinburgh, and they have been

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treated there, and one of them is still there. I have also to say that these two men came back from Mysore in India. The worms were on exhibition microscopically.

4975. Now we come to three other diseases. There is miners' elbow, miners' knee, and there is beat hand?—Yes.

4976. Would you please tell us about these three briefly?—Miners' elbow is a bursitis over the point of the elbow, and it is got by the action of holing, rubbing constantly on the elbow during the work.

4977. But could not that be obviated by wearing a leather pad?—Well, it could be done; they are used in point of fact, but on account of the awkward position in which the men work, under the low workings especially, they have to stretch their arms right into the seam of coal, and so it is impossible to wear a pad. They want all the room they can get, and even if there is a pad underneath, though it does ameliorate the friction to a certain extent, it does not avoid it. The men often sit with their elbow on their knee if they have room, but in the low workings they have to put their elbow naked on the ground.

4978. And what are the effects that are produced by this condition, I mean how far temporary or how far permanent?—The bulk of the cases are merely an inflammation of the bursa, similar to housemaid's knee. The inflammation goes down, and as a rule goes off, but sometimes it goes on to suppuration, and in one unfortunate case that I had at the end of 1906 cellulitis commenced, spread from the bursa to the tissues of the arm and forearm, and the man died with septicæmia within eight days after he took it. He was absolutely well on the Saturday, and died on the following Sunday week, so that in certain cases it is a serious ailment, and the man got it undoubtedly at his work from the friction. He had complained for some little time beforehand of gatherings in his elbow, and that was the elbow he kept rubbing on.

4979. Can you call that a sufficiently common disease—miners' elbow—to be proper to schedule, because you cannot schedule a thing unless it can be called a more or less characteristic miners' disease?—It is very characteristic, and it is pretty common.

4980. Does it cause men to stay away from their work for short periods?—Yes, I think about a fortnight during the acute stage, on the average. It is in the little bag at the elbow. The fluid absorbs there and the inflammation becomes cool.

4981. It is made the subject, is it, of payments by the benefit societies at present?—Oh, yes, undoubtedly when the men are off with that, and a miner cannot work with a bursitis of the elbow if it becomes inflamed.

4982. Is miners' knee the same thing occurring to the knee?—Practically the same thing at the knee instead of the elbow—the same as housemaid's knee.

4983. Does it not strike you that if the miners have this disease included in the schedule, all the housemaids in the kingdom would want housemaid's knee included?—In some pits the man is never off his knee from the time he begins his work until he ends, on account of the lowness of the workings; a housemaid gets down to scrub the floor in the morning, and gets up and is done, and has other work besides that.

4984. She will say, "Never mind, I may get my knee in a short time"?—I think she would be quite entitled to claim compensation.

4985. (*Professor Allbutt.*) A slater, who has to do pretty much the same thing, wears a pad, which he fastens on to his knee?—Yes, kneecaps.

4986. Have you ever heard of a slater suffering from beat knee?—I have never treated a slater all the time I have been in practice for anything wrong with his knee other than an ordinary accident.

4986*. Why do not miners wear pads?—Miners do wear pads sometimes, but as a class they are not very much given to forethought; they take things as they come.

4987. (*Chairman.*) You could not fairly ask for compensation in cases where a little reasonable forethought and care in working would have obviated the injury?—That is true, but it would take more than a little forethought in this case, because even if a man were to wear a slater's pad on his knee, on account of being all day long on his knee the friction would be sufficient. It is essentially a pressure ailment.

4988. (*Professor Allbutt.*) Are you speaking of cases where you know they have worn slaters' pads?—Yes. They have to go down on their knees suddenly, and sometimes they cannot take the same care as a slater, who has to climb cautiously on a roof; he has to get down suddenly and work in an awkward position.

4989. You have known a number of cases of this beat knee in miners who were actually wearing a pad?—Yes, I have known that very often, and their clothes are so thick really that they amount to a pad; they wear very thick clothes.

4990. Would you go a little further and say that you could tell us of any improvement in the pad, such as a hollow pad, or long pad, or anything of that kind?—A pneumatic pad would be the best.

4991. A pneumatic pad might be expensive and troublesome?—Yes.

4992. Pads are sold for housemaids, and consist of a twist of straw simply?—Yes.

4993. And the twist takes the weight off like a cushion?—Yes, it puts the bursa opposite the hollow of the pad. It is rather awkward that this work is work that requires all the men's activity; they are not able to hamper themselves very readily; they strip.

4994. (*Chairman.*) It will be a comparatively small thing; there are not so many men get it?—A good many get the ordinary form of miners' knee, housemaid's knee or miners', but it is very seldom that it runs on to a very extensive disability.

4995. But it disables them from work for a short time?—Yes, about a fortnight or three weeks, unless it goes on to suppuration, and a deep-seated inflammation of the bone, as it sometimes does.

4996. Might not the putting in of miners' knee lead to a great many people finding that their knee was very bad when they wanted to be doing something else with it?—Well, you could not simulate that. You could not pretend that you had a miners' knee or miners' elbow without producing the evidence of it; it is a thing you can see and feel.

4997. A doctor would see that there was something, but a man might think it was a good deal worse than it was, might he not?—No; a doctor who knows his business—a surgeon would know in a second that a bursitis was in an acute stage by the tenderness of it and the redness of it, and the fluctuation of the bursa itself; you can feel it without a man opening his mouth about the pain. So far as diagnosis is concerned, the pain is really subsidiary.

4998. It is water?—It is fluid.

4999. In the knee joint?—Not in the knee joint, outside the knee joint, in a little bursa that is over the point of the bone, or over the ligament. Beat hand is practically an inflammation of the tendon sheath.

5000. (*Professor Allbutt.*) Is that what is known as Dupuytren's contraction?—No.

5001. What is the difference?—The difference is that Dupuytren's contraction of the tendon is a permanent contraction of the tendon; the other is an acute inflammation due to the pressure of the soft tissues of the palm of the hand, or the palmar aspect of the fingers.

5002. That does not go on to contraction?—Not unless as the result of a destruction of tendon.

5003. That is not characteristic of it?—No; but it recovers entirely, provided there is no destruction of the palmar tissue, the tendon sheath, or the tendon itself. The last case I had, for instance, was a very severe case that went on to suppuration, and I had to open it under chloroform. The recovery was complete, but I have seen it again where the destruction of the flexor tendon was sufficient to make the finger go quite straight, and the man could not bend it at all.

5004. That is an exceptional result?—Yes.

5005. The ordinary result is release of the pus?—Yes.

5006. (*Chairman.*) To be frank, one does not see so great difficulty in scheduling very serious cases of miners' knee and beat hand, but if these ailments were included generally in the schedule men would be applying for compensation in respect of incapacitation from these ailments for quite a small period of time, even a few hours, and that would lead, it seems to me, to considerable difficulty in administration; whenever a man had got a soreness of the knee or hand he would apply for compensation. It is not the small ailments you are really thinking of?—No. I am speaking of the suppurative cases, where the inflammation runs on to suppuration.

5007. Could you assist us to distinguish the small cases from the serious ones? Is there some technical term that would differentiate the one from the other?—It is really the same as whitlow, but affecting the palm instead of the finger. I should say suppurative inflammation of the tendon sheath would meet it.

5008. That would be a more serious condition than schoolboys get from using a cricket bat; you are talking of something that is a real suppuration, and that would disable a man seriously for a short time?—I should say that where the inflammation runs to suppuration the man would be entitled to be compensated for it.

5009. But not unless?—No, he would go back with a little stiffness—a tender foot, as the Americans call it.

5010. It is suppuration you are asking for?—Yes, suppurative inflammation.

5011. What would be the exact word you would suggest to express what you mean by beat hand?—I should say miners' beat hand running on to suppuration, or suppurative inflammation of the hand.

5012. And shall we take the same for miners' knee?—I should say inflammation of the knee or the elbow, acute inflammation without suppuration. You can have a very acute miners' knee or miners' elbow, incapacitating him from work, without it running on to suppuration, but in the hand it is different, because the skin, as a rule, is very hard, and the inflammation is kept in between the bone and the skin, and so it very frequently runs on to suppuration in the hand.

Mr. THOMAS SPENCE MEIGHAN, M.D., called and examined.

5020. (*Professor Allbutt.*) You are surgeon to the Glasgow Eye Infirmary?—I am.

5021. And lecturer on ophthalmic surgery at Anderson's College Medical School, Glasgow?—Yes.

5022. You have come to tell us about miners' nystagmus?—Yes.

5023. You might be good enough just to give us your evidence on the subject; you have put in a statement?—Yes. That is a short synopsis of what my experience is. It is under the following headings:—"Experience of the disease," "Length of incapacitation involved," "Rapidly of development of the disease," "The characteristic symptoms, and whether they can be easily diagnosed by an ordinary medical practitioner," and, finally, "Whether it is associated with or the cause of other diseases."

5024. We might ask you what degrees of incapacity you attribute to nystagmus, incapacity for work?—I have classified three degrees of incapacity—namely, that there are a number of men who are slightly affected, and they do not give up their work, they still continue working, and they give it the name now of the "Glenny blink," because they use a Dr. Clanny's lamp. These men suffer to a slight extent from the characteristic oscillations of the eyes, and especially when they assume positions that strain the muscles of the eye.

5025. What percentage of the men do you think become affected, that is the early type, this stage that you are speaking of?—I have not had time to examine my books at the infirmaries. I only got the notice on Thursday, and I had to send my statement by Saturday, so I had not time to look up all my statistics, but I would say, speaking from memory, that altogether we would have about, say, 5 per cent. Then there is a second type of the disease—namely, men who suffer worse from the oscillations and so much so that they feel giddy at times, and they have to leave off the work that produces it.

5026. Then if in the first stage there is not necessarily incapacitation, in the second stage it is surely incapacitating?—Yes, that is so.

5027. How many of them come from the first stage to the second, a large number of them?—No, a small percentage of that number. Then there is a third number, who have the oscillations and giddiness and headaches so badly that they have to leave off pit work entirely.

5028. Then the second stage is not absolutely incapacitating?—I have known men leave off entirely

5013. (*Professor Allbutt.*) We heard from Mr. Snell, or some authority, that there was a rather bewildering want of parallelism between the apparent degree of nystagmus and the subjective symptoms of the man. I think you put it rather the other way—that they run parallel, and in a bad case there is atrophy?—Yes.

5014. I think Mr. Snell's suggestion to us was that you might have a very great deal of subjective distress and a slight degree of nystagmus, or you might have a high degree of nystagmus and a man trouble himself very little about it?—I should say in that case the severity of the subjective symptoms would be due to something else than the nystagmus, apart from nystagmus, that anyone might be subject to apart from the nystagmus, but not directly attributable or indirectly attributable to the nystagmus.

5015. (*Dr. Legge.*) You say "acute inflammation of the bursa of the elbow or of the knee"; is acute bursitis in itself sufficient?—It is sufficient.

5016. Are there any other bursæ that get affected amongst those miners except those; there is one over the olecranon process?—Yes.

5017. And over the patella?—Over the patellar ligament; it was just to avoid a technical term that I was using it.

5018. I mean acute bursitis in itself could not be mistaken for anything else?—No.

5019. And you do not suggest that compensation should be paid except in those cases in which the cardinal symptoms of inflammation are present?—Yes, swelling, pain, and redness.

in the second stage for six months or so and get employment above ground; they go back to their work perhaps in six months or a twelvemonth, but not to do what is called holing—that is, lying upon their side and constantly looking up.

5029. Do you mean that they could never do that any more?—Yes, they would not do that any more, and those of the third degree would not go into the pit at all.

5030. But the condition at the second stage is incurable?—If they continue at their work.

5031. Or it would relapse if they went back to their work?—Yes, it is curable if they stop working in the pit.

5032. The proclivity to it is incurable?—Yes.

5033. In the third stage there is, I suppose, a good deal of deterioration of the eye itself?—There is, associated with it disease of the optic nerve.

5034. That would mean even incapacitation for bank work or anything?—Yes, about a pit. I believe, however, that these men could do some labouring work by and by above ground.

5035. Could you, without any questions, but from examining a miner who comes before you, with fair accuracy, form an opinion as to the degree in which he was likely to be incapacitated for work?—Submitted for examination just right off?

5036. Submitted for examination, and you had only the objective symptoms to go upon?—I would form a good estimate, but I could not say positively. I would need to test his eyes and vision.

5037. But before you began to ask him any questions you could form a fair estimate?—Yes.

5038. So that you would not be likely to be much misled?—No, not a great deal.

5039. Supposing a man came with a slight degree of nystagmus who was a malingerer, you would find him out?—I think we could form a fairly accurate opinion of such a case.

5040. Then, roughly speaking, the objective symptoms and the degree of the disease are fairly parallel?—Yes.

5041. In the first stage the cases would not come up for compensation at all?—Well, probably not.

5042. Supposing that a man did come to you with the first degree of nystagmus, should you feel bound to incapacitate him—to lay him by for a time, in his own interests?—Yes, that might be.

5043. For how long?—Probably three to six months.

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5044. He would be one of the small minority as going on to the second stage?—You might ask him to leave off pit work entirely, and then try him in the pit again at another job.

5045. In that case every case of incipient nystagmus would mean some kind of rearrangement, some kind of compensatory change of work, or something of the sort?—Not necessarily. I know of a great many working now who have a slight degree, and they call it "Glenny blink," and they keep on working.

5046. The majority who are affected never get any worse?—Yes.

5047. But supposing they came to you in an early stage, as they probably would if any question of compensation came up, and said, "Am I going to get any worse?" and you would say, "In case you should get worse I have to take you off for six months"?—That might be so. Then the question of a man getting a small fire in his eye might also crop up, and there would be a question of giving him compensation; if he were subject to nystagmus and got a slight accident it would put him off, not altogether through the accident, but through the combination of both the accident and the nystagmus.

5048. The difficulty seems to be the nystagmus. If you are bound to take a preventive measure of that duration, if the cases amount only to 5 per cent. of the whole of the workers, there might be a heavy claim for some periods of suspension, wouldn't there?—There would be.

5049. It would really bring every case into question?—Provided they suffered from the slight accident do you mean?

5050. He would come to you if he had got nystagmus?—Yes.

5051. He would come at once and say, "Now, I have got this thing"?—That might be.

5052. And then you would feel bound to say, "Then you must give up the work"?—Yes, or if he was honest and wishing to do his best not to take advantage of his claim to compensation, he could take some other occupation in the first instance, and not declare himself as a claimant for compensation, and see how he might get on.

5053. Supposing that he comes to you with this disease and says to you in good faith, "I know a great many men have it, and they do not come to grief with it, but I believe a certain number get much worse, and become wholly incapacitated, I want to take this disease at the beginning," you say, "In your interest I am bound to put you to some other employment for six months, which may mean a loss of one-third of your wages"?—Yes, that would be the rendering of it.

5054. So that many more would come under treatment than would in the ordinary course of things?—Yes, than what are doing at present, many more would come complaining, seeing that there was compensation.

5055. (Dr. Legge.) Do you know of cases of "Glenny blink" which you have described, where the men affected have given up the work for three months, and have got completely better so that the nystagmus was not visible?—I know of some cases that have had it, and they have left off their work for a few months, and gone back again, but avoided the particular branches of the occupation that they thought gave rise to it.

5056. But that is hardly a reply to the question; they have never been exposed to the old conditions, those ones that you are referring to?—Yes.

5057. Do you know of those who have gone back to the same work after they have got better; does the nystagmus recur?—It does.

5058. To the same degree?—Well, perhaps not quite so bad, but it usually recurs.

5059. If that is so, and it does not progress, what would be your reason for telling a man that he must give up the work for three to six months when he comes to you affected in a slight degree only?—To try and get rid of it, to take to some other occupation. Once he has come complaining of nystagmus it is usually advanced a bit further than what he thinks it desirable to continue at his occupation, and they do not come usually to seek medical aid until such a condition has attacked them.

5060. But we are rather anticipating a certain order of things when they will come?—Yes, I believe those that are not applying now will come, many of them.

5061. Could you not tell by allowing them to go on with their work for the next three to six months whether the condition was improving or getting worse?—We could tell certainly, but, as a rule, we find no improvement. We have tried that; nothing seemed to benefit them unless they gave up the particular kind of occupation.

5062. (Professor Albutt.) You could not say how long would have to elapse between passing from the first stage into the second, a matter of months or years?—They might be months, and they might be years. I have known them go on for years in that primary condition.

5063. They are incipient?—They are very incipient; it depends a great deal on their general health.

5064. (Dr. Legge.) And they do not go on to the second degree?—No, only a small percentage of them.

5064*. You mentioned 5 per cent. as those in the first degree going on to the second?—I would say 5 per cent. would about cover the whole of the cases of nystagmus.

5065. You would only let them go back to work if they could find some different employment about the mine where they were not exposed to the same conditions?—Yes, that is so.

5066. You know Mr. Snell's opinion?—Yes.

5067. Do you agree with it?—Yes.

5068. That it is a fatigue of the ocular muscles?—Yes, of the elevators.

5069. Do you think that the kind of lamp used has anything to do with it?—Secondarily it has something to do with it, once it has established itself the light aggravates the condition.

5070. But the miners give to the kind of lamp used undue importance?—They do so; that is the way they call it the "Glenny blink," but we have it in those who use open lamps.

5071. Have you known of cases where the disease has led to permanent incapacity?—I know of two just now; I know of one in the poorhouse.

5072. What form have they ultimately assumed?—This man has atrophy of the optic nerve and very defective eyesight, and the oscillations.

5073. It does cause optic atrophy?—It causes optic atrophy to some extent.

5074. After excluding the other causes of optic atrophy?—Yes; in the cases that I have noticed I have nearly always found some changes in the optic disc.

5075. (Professor Albutt.) In the final stage?—In the secondary stage, and then going on to the final stage.

5076. (Dr. Legge.) Optic neuritis do you mean?—Yes. A form of optic neuritis, showing pallor of the disc but not the characteristic swelling of acute optic neuritis. Miners' habits are irregular, and perhaps drink and other causes have contributed to cause the changes in the optic disc.

5077. (Professor Albutt.) Supposing in view of those people coming down upon you for the first stage of nystagmus that you say, "Very well, we are not going to take you off the work, you must take your chance, and come again if you are worse"—a small percentage of them do get worse—would any serious injustice be done to that man, or could he on getting fair compensation change his occupation or do something else without grave disadvantage to his future life?—I think he could; if he were a thrifty man he could turn himself to some other occupation.

5078. You might then disregard the first stage, and see how many of the affected came to the second, and when they did come to the second you could deal with them: that would be an alternative plan, would it not?—It would.

5079. It would not be running too grave a risk?—No.

5080. (Dr. Legge.) Can you predict at all the kind of man who is going to get nystagmus?—No, and we seldom see them in their previous stages or conditions, but there is no doubt, I think, that there are predispositions.

5081. What are the predispositions, do you think?—I think that they are cases of a nervous temperament, and probably have a languid circulation, and a predisposition to anæmic conditions or something analogous.

5082. And if nystagmus is going to develop, does it

develop within a specified number of years after commencing work?—No.

5083. It is irregular?—It is very irregular in some cases. I have known them working for twenty years, and then develop it in a few months.

5084. Debilitating conditions resulting from influenza, I suppose, predispose to development of nystagmus?—Debilitating condition generally would predispose to it.

5085. (*Professor Allbutt.*) Putting it in the same class as writers' cramp, and some of those things?—Yes, from fatigue of the muscles.

5086. (*Chairman.*) If miners' nystagmus were put down among the diseases to be subjects for compensation under the Workmen's Compensation Act, would that cause a wholesale number of applications so as to be very embarrassing; how would it work out in practice, do you think?—Well, there is one thing, it would strengthen an applicant's claim if his claim were otherwise doubtful; for instance, a man who got a slight blow on the eye with a chip of coal, which left a

small opaque spot, a nebula, if he also had nystagmus of a slight degree, might say that between the defective condition now resulting from the slight opacity of his cornea and the nystagmus he was quite unable to work.

5087. That would be an accident, would it not?—Partly accident and partly nystagmus.

5088. Then being an accident it is already provided for in the Act?—Yes, but not unless he has defective vision below a certain standard.

5089. Yes, it would be a subject for compensation if it kept him out of work for a certain number of days?—Yes, he would be compensated, but after the injury has healed he might hold that there is a permanent defect of his vision from corneal opacity and nystagmus, and claim compensation. That is one class of man. Another class of man might hold on to nystagmus along with some defective acuteness of vision on account of optic nerve disease, and he would claim compensation. On the whole, I do not think there would be very many.

Mr. T. S. Meighan,
M.D.

16 Jan. 1907.

SEVENTEENTH DAY.

Thursday, 17th January 1907.

PRESENT:

Mr. HENRY CUNYNGHAME, C.B. (*in the Chair*).
Professor CLIFFORD ALBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Mr. ARTHUR MECHAN, M.B., C.M., called, and examined.

5090. (*Chairman.*) You are a graduate of Glasgow University, and have been a general practitioner in Glasgow for the past 24 years?—Yes.

5091. You appear here to give evidence on behalf of the Engineering Employers' Federation and the Shipbuilding Employers' Federation?—That is so.

5092. And you are going to deal principally with three diseases—the caisson disease, fibrosis of the lungs, and neurosis due to vibration?—Yes.

5093. We will take them in order, and perhaps you will allow me to take caisson disease first?—Yes.

5094. I think you may take it that we are acquainted with the general character of caisson disease. I think I am right in saying that the pressure causes the blood to absorb nitrogen, and when the pressure is taken off the nitrogen gas is set free and bubbles up into the blood, and tissue fluids of the body, and then interferes with the circulation?—Yes.

5095. Perhaps you will therefore go at once into details?—I have gone into the matter from a practical point of view in interviewing some of the larger members of the trade here, such as Sir William Arrol and one or two of his men, and got their practical experience, which had extended over a period of from 25 to 30 years.

5096. I should like to point out that supposing caisson disease could invariably be treated as an accident, it would be unnecessary to put it in the third schedule to the Workmen's Compensation Act, because under the Act at present there are two different things provided for—first, an accident, and, secondly, an industrial disease; in so far as a man is suddenly overcome with a disease the courts would hold it was an accident, but anything like a chronic disease, which is produced gradually in the course of and by reason of a man's employment, would be a subject for compensation, and would be liable to be placed in the third schedule. Now, I should like you to turn your attention particularly—I think we all should—to the chronic after effects of a dose of, or of a number of repeated doses of compression, or of a long employment in caisson work, even though decompression chambers had been

used?—My personal experience is exceedingly limited, but I have made inquiry, especially of Mr. Andrew Biggart, a partner of Sir William Arrol, who has been in connection with all these works, such as the Forth Bridge, and these questions which you ask I put to him. I asked his experience regarding the after effects, and also whether he thought it was an accident or was due to any disease following. His experience, as I say, has been very large, and he is quite convinced that the disease comes on suddenly, or comparatively suddenly, after leaving the decompressing chamber.

5097. But there are after effects also which last for some time?—Yes, his opinion is that the after effects, as a rule, are not lasting.

5098. But they may be?—Yes.

5099. I understand that the Employers' Association are not prepared to resist the putting of this disease into the third schedule?—They are not, they are quite agreeable.

5100. Well, then, we might leave this question, unless there is any general remark you would like to make upon the caisson disease?—Well, I think you have got so much evidence about it that I would probably be going over the ground again.

5101. I think you would, because we have had before us gentlemen of wide knowledge of the subject who have experimented regarding it?—Yes, I have read the evidence of Dr. Hill, and I may say that the information I have received is very much in keeping with what Dr. Hill says in his evidence.

5102. Well, I think we will leave this matter now and take the second disease—viz., fibrosis of the lungs, and perhaps you will allow us to call it gritty fibrosis from inhalation of silicious particles?—Well, so far as the Federation is concerned, it is entirely metallic particles I have to refer to.

5103. But potters' rot is the result of the inhalation not of metallic, but of silicious dust?—I do not think we have anything in the Federation in regard to pottery work; it is entirely metal, such as brassfinishing, etc.

5104. But, still, I suppose your Federation would admit that in the case of steel dust ground off by

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emery wheels and grindstones the emery or silica, the silicious particles from the stone, play quite as important a part as the steel in the production of the disease?—Yes, silica will in any conditions.

5105. It is the silica and the metal?—Yes. Well, my experience, of course, has been that we have not a great deal of fibrosis of the lungs at all in our Federation. I have taken the evidence, which I have got here typewritten, of three or four of our men who have been 30 or 40 years in the trade, and all the evidence goes to show, along with my personal experience, that fibrosis of the lungs in such trades as we are connected with in the Federation is really absent.

5106. I suppose in the shipbuilding trades you have got a certain number of men who are engaged all day at grinding, who do grinding and nothing else?—That is so.

5107. But also you have got a much larger number still who do a limited amount of grinding as an occasional day's work?—Yes.

5108. Who grind their tools for an hour or two?—Yes.

5109. So that we have got in your trade particularly to distinguish the regular grinder from the man who might be called the occasional grinder?—Yes, the only regular grinding trade in the Federation is that of the brassfinishers, who are pretty well or nearly constantly at some brass grinding work.

5110. But do you not get odd steel surfaces, too, polished all over in the same way that bicycles are got up?—Yes, to some extent, but not largely in Glasgow.

5111. So in your trade the occasional grinder would play a very much larger part?—Yes.

5112. Supposing gritty fibrosis of the lungs were put down in the third schedule to the Act, would it meet the views of your Federation if there were exempted men who only do a very limited amount of grinding in the course of their work; I suppose that could be arranged?—If that could be arranged it would meet our views very well; we would naturally rather be excluded altogether, of course.

5113. But assuming it was not possible to meet your views as regards entire exclusion?—Well, we would accept what we could.

5114. Suppose a grinder to be employed the whole of his time week by week in grinding steel or brass, having regard to the liability of grinders to contract this disease, he ought not to be so employed without being included in the benefits of the Act?—We would accept your definition; we should quite accept what you say.

5115. Have you had practical experience of gritty fibrosis of the lungs—experience of your own?—I have seen it altogether in twenty-four years about three times in private practice.

5116. Would you be prepared to concede this position, in regard to which a great deal of evidence has been given, that there is really no great difficulty in diagnosing a man's ailment, and, assuming that he has got phthisis, deciding whether it is a gritty phthisis or another phthisis?—In the early stages it is pretty easy when you get the solid lung; but later, when the tuberculous phthisis enters into it, it is not very easy.

5117. Are you prepared to give us evidence upon that question of whether it would be easy or difficult?—I think it is difficult.

5118. But not impossible?—Not impossible with an expert.

5119. But assuming you have got the best expert assistance?—In the earlier stages it is easy, but in my experience and from my reading I should say in the later stages it is not.

5120. But if in the later stage you are assisted by the history of the case, and have full powers to inquire into the man's whole life, how he has been working, what stone he is working at, and every other factor in the case?—I think that is only fair.

5121. If you had all that information you agree that it would not be an impossible task for a medical man to do justice on the whole between the employer and the man in discriminating the true industrial disease from the tubercular trouble?—Well, if all these precautions were taken, these are only fair premises.

5122. Can you give us an idea of what grinding a man who could not be considered a grinder would do in a week; supposing you said a man was not to be considered a grinder who did six or eight hours' work only per week?—He is not a grinder under these conditions.

5123. Would not that six hours be practically all that was needed to exempt the cases that ought to be exempted?—It is a very short period.

5124. I think after six hours a week a man rather becomes a grinder; if he begins to work two days a week at grinding, doesn't there begin to be a possibility of giving him phthisis?—Well, I know in my investigation that we have men at the brass work who are grinding more than six hours a week.

5125. Give me a case of a man who is grinding the whole week or a certain number of hours?—These men I referred to are all grinding a certain number of hours; I have not the exact time, but I am certain it is three hours per day.

5126. Would not you say that a man who was more than three hours a day at it was so far within the risk that he ought to be included within the benefits of the Act?—But the proof with these men is that they have not had any phthisis.

5127. You assert that no man who only grinds three hours a day would get gritty phthisis?—From my experience and what I have seen I should think not.

5128. Would you say four hours a day—would you go as far as that?—I think he could do four hours a day. I think a man working five hours and standing over a wheel is exposed to the disease.

5129. Surely he is exposed to it if he stands four hours?—But these men, after doing that work, are going about doing other things.

5130. But if you are going to keep the men as long as four hours a day at it, you might easily arrange the work so that it was done by a man who was working all the day at it, and the other work could be done by somebody else; it is not like a case of an engineer who wants to sharpen his tools, it is quite a different thing?—Yes, none of these men are really called grinders in these trades.

5131. Could you give us an instance of one of these partial grinders—describe to us what he would be called in the trade?—He is called a brassfinisher.

5132. How many hours a day does he grind?—I could not say definitely, but I know his work is varied; he is not always sitting over his grindstone; he is going about doing other work—fitting, for instance. The brassfinisher does part of the brassfitting.

5133. I should have thought the brass polisher or grinder stuck to the grinding?—In these works they usually intermingle with each other in doing work of that kind—in brassfinishing and foundry works.

5134. You are not able to answer how far the work could be thrown entirely on the grinder and the others set free?—I cannot positively assert.

5135. But at all events you are prepared, so far as your information goes, to say that some exemption of men who could not strictly be called grinders would meet the difficulties of the trade entirely, and then it would become a question of how you would define it?—Yes.

5136. Could not the Employers' Federation help us by some information on that if it was put before them?—Yes.

5137. And then they could say what they want?—Yes.

5138. Dr. Leggs points out that in speaking of grinding you might take it to mean something of this kind, "abrasion of metal by means of grinding stones or wheels composed of emery or corundum or carborundum"; they now largely use leather and wooden wheels on which these stuffs are fixed; we should call all that grinding, although, strictly speaking, some of these processes should be called polishing?—Yes.

5139. In my use of the word grinding I am including these processes, but when you come to mops, that are sometimes called dolies, consisting of pieces of circular rags, there does not appear to be the same danger of phthisis existing there?—That is so.

5140. In the case of Sheffield lime and things of that kind, our attention does not seem to have been called to these as a source of danger?—Yes.

5141. The real danger consists in the abrasion of metal and sandstone?—Yes.

5142. And it strikes me that it would be very valuable when you go back to put that before the Federation?—Yes.

5143. And you must be very moderate because it is really to exempt the engineer who is sharpening his tools—that is the main object?—Yes, the danger we were afraid of was that all these men might be included.

5144. We felt that. We were perfectly aware that an ordinary fitter does not spend anything like six hours a week grinding tools?—Yes, I think that will assist us very materially.

5145. Probably some such exemption as has been suggested would meet the views of your Federation. At least it presents a working basis?—Yes, we were just afraid it was all-embracing.

5146. And your Federation would not feel the inclusion of the regular grinders within the benefits of the Act to be a hardship?—We would have felt it a hardship for all the men who were doing any grinding or polishing to be included, but I suggested to them that it would be very difficult to differentiate, and we must have some definition.

5147. Particularly in view of the fact that the disease itself is not one that can be diagnosed with certainty in each case?—My opinion is that it will meet our views very well if some clause of that kind is put in.

5148-50. (Dr. Legge.) An exhaust system of ventilation would be applied to every wheel, even where the fitters are; I mean the dust would be removed?—Yes.

5151. (Chairman.) The only thing is that you must not consider this is a definite offer, which we have no power to give?—Yes.

5152. It is merely a suggestion thrown out for your consideration, and must not be considered as a definite offer?—Yes. I am pleased with the suggestion, because it removes a good deal of difficulty.

5153. Is there any evidence that you would like to give on the nature of gritty phthisis?—No, I have nothing here but the statement of the men who have been at the work for 14, 16, and 20 years, and they have not got it.

5154. But we are quite aware you can always produce such men?—But these men have all been foremen for many years, and they are not aware of any men having it in all their experience.

5155. I daresay the question of including this disease in the third schedule might not perhaps be so important if the only trade involved was shipbuilding?—That is so, and the fear we had—although there have been cases in the past—was that when the suggestion is made many cases may arise in future. I mean to say that when the suggestion is made to the men that such diseases will in future be treated by compensation, it will be wonderful how many cases we will see within the next five or six years.

5156. But a man cannot malingere phthisis?—No; but it may only be a pathological change, and have nothing to do with his trade, and in many cases we would have these claims made.

5157. But you would have them made in all cases wherever a man had got phthisis if he was a grinder, and it would be for the medical man to see and decide?—Yes, but we want the definition of what real grinding is. As you suggested, we are afraid that all men in public works where there is any grinding would make claims for phthisis. I think the suggestion that has been made for us to investigate is quite sufficient for our purposes, and I will put it before the Federation.

5158. And perhaps they will send us their opinion in writing?—Yes.

5159. It is quite clear that it is not an offer, but merely directing your attention to a suggestion which might meet the difficulty. The suggestion is decidedly worthy of very careful consideration, but beyond that we cannot undertake to go?—Yes.

5160. Then with regard to neurosis due to vibration; is it the fact that a man engaged in handling a pneumatic hammer and in drilling holes with drills suffers from loss of sleep, trembling, and a good deal of nervous upsetting; it is apparently asserted that this occupation has permanent ill-effects?—I have gone into that carefully. I know a good deal about my own people's firm of Mechan and Sons, who employ about 1,200 people, and I got every facility for investigating

this matter. If they were not the first they were among the first to adopt pneumatic tools on the Clyde, and I have been in touch with them off and on all the time. I spent a day last week watching the men and inquiring, and I saw the foreman, who has been there 15 years. He says the suggestion is absolute nonsense, that all the years he has been at it he never heard a man complain. I asked five or six of the men about it, what their experience was, and they did not seem to understand what I was talking about. I used the hammers myself, and tried them of various weights and sizes. There is no doubt to a professional man that there was a good deal of vibration. I asked several of them who in the past had used the hand hammer and had now adopted the pneumatic hammer, and they all agreed that they preferred the pneumatic hammer. I said, "Probably that is because you get through more work with it," and they said that was one reason. I said, "Do you find that you can use it quite as well and as long," and they all agreed. I asked a question in regard to insomnia, and they said it did not affect them.

5161. You asked about insomnia?—Well, I was simply talking of it as neurosis; I was putting the general question, and I asked if there was any head symptom, and found there was none. Generally I asked in as particular language as such a man would understand about the neurotic symptoms, but I failed to elicit that any one man had suffered.

5162. Now with regard to deafness?—Deafness is undoubted.

5163. Is it temporary?—No, it is permanent. One man says that the deafness, if not worse, is equal to that of men in an ordinary boilermaking shop. They all suffer from deafness to a more or less degree.

5164. If they leave that trade for a year or two, do they recover their hearing?—I cannot say, but I should think not. The cause of the deafness is the same as the cause in the case of a boilermaker. If you get a boilermaker five or ten years after he has commenced his trade, he is quite as deaf. Plugging the ears would obviate it if they had started their trade with that. It would prevent vibration to a great extent, but the men will not do it, although it has been suggested to them. I suggested it to those men in my father's and brother's foundry, but they will not do it.

5165. Then they do not mind the deafness?—No; it does not inconvenience them beyond that they do not hear.

5166. Do you think there will be something in this, that if a man is going to be a boilermaker steadily he prefers the deafness as being absolutely in some respects an advantage?—He just stoically accepts it, and there is no more reason why a man who has got deafness by the use of a pneumatic hammer should be any different from the man who has got deafness through boilermaking. There is no neurosis in a boilermaker from deafness.

5167. And it does not affect their wage-earning capacity?—Not in the least.

5168. (Professor Allbutt.) Do they become stone deaf?—Not absolutely; if you speak loudly to them they can hear quite well, but they never complain. I never heard a complaint from a boilermaker that his deafness in any way interferes with him either socially or in his work, and I know them well. As I say, I have seen and examined within the last eight years between three and four thousand of them. We naturally think if that was put down in the broad sense of neurosis due to vibration there would be no end of trouble on the Clyde. I do not blame the workmen, but I may say that we have got a class of lawyers in Glasgow which scarcely exists anywhere else, and we know quite well that they would suggest to the men what the men would never think of themselves.

5169. (Chairman.) You consider this, that if a man feels he will get some money he will naturally try for it?—Yes, if it is suggested to him; but the men themselves would not do so—the real working men.

5170. (Professor Allbutt.) What do you mean exactly by fibrosis of the lungs?—I mean a lung that has by absorption of some metallic or other material become thickened and hardened to begin with, probably in its entirety, and subsequently to that it breaks down from some cause; but in the early stage my experience has been, in the three or four cases I have seen, that it was difficult to make out when the lung was fairly solid.

5171. In which tubercle played almost no part or a secondary part?—In one of the cases I cannot see

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Mr. A. Mehan, M.B., C.M.
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5172. Supposing it to be alleged that the grit acts

Mr. JAMES GAVIN, called, and examined.

Mr. J. Gavin. 5173. (Chairman.) What is your position in the Amalgamated Society of Steel and Iron Workers?—General Secretary.

5174. Shall we take your evidence and that of Dr. Wyper the one after the other?—So far as my evidence is concerned it will be very brief, because I think this inquiry is mostly a matter for medical evidence.

5175. At all events, there are some questions which I should like to ask you which you ought to be able, I think, to help us in as well as the medical man; among the diseases you wish to call attention to are poisoning from noxious vapours as an exciting cause of bronchitis, acute pneumonia, and consumption?—Yes.

5176. There is also fibrosis of the lungs from inhalation of silicious or metallic particles, and pneumonia from inhalation of basic slag dust?—Yes.

5177. And dilatation of the heart, leading to heart failure?—Yes.

5178. Those are the diseases to which you wish to call attention?—Yes.

5179. We will first take the noxious vapours. What are the noxious vapours to which you refer?—Primarily gas from gas plant.

5180. Would that be carbon monoxide?—Yes, chiefly.

5181. Blast furnace gas?—Both that and steel works gas.

5182. Are there any other noxious vapours that you desire to call attention to in connection with these works besides carbon monoxide?—No, I do not think that there is any other.

5183. That is the principal one, at all events?—Yes.

5184. I suppose you will be aware that if a man was overpowered with carbon monoxide he would fall into a faint and lose consciousness?—Yes.

5185. I suppose you are aware that that would be an accident already under the Act?—Yes.

5186. So far, then, as the overpowering of a man's concerned it would not be necessary to deal with that as a disease, because it is already a matter for compensation as an accident?—We have not raised the question so far as the overpowering is concerned; we are aware that it is covered by the Act, and we have been paid under the Act for men who have suffered in that respect.

5187. Then arises the point whether there is such a thing as gradual poisoning from noxious vapours?—I think that is a question for the doctor entirely.

5188. Very well, we do not wish to put any question that your experience would not be able to answer?—That is so.

5189. I shall ask the doctor whether there are any other permanent effects, chronic effects, due to carbon monoxide, but I want you to be fully aware of the points so that you can give your views on them from time to time as they arise?—Yes.

5190. We might now leave this question, viz., poisoning from noxious vapours as an exciting cause of bronchitis, acute pneumonia, and consumption, at least, so far as you are concerned. The doctor will, of course, be at liberty to say anything he likes on it?—Yes.

5191. I go next to fibrosis of the lungs from inhalation of silicious or metallic particles?—Yes.

5192. That is what I suppose you would call grinders' phthisis; it is the grinders chiefly who get that?—Well, that may be so. We find that we have a lot of people in the blast furnace trade who are inhaling slag particles and ore particles.

5193. That is so far new to us. You have a number of grinders in your society?—No, we have no grinders, but the effects resulting from the emptying and the loading of the material, the ores, etc., are almost the same as if the men were grinding it, because the dust

also as a determinant of an outbreak of ordinary tuberculous phthisis, your evidence would be that ordinary tuberculous phthisis is not more prevalent among the men of whom you are speaking than in the ordinary population?—I do not think it is.

is flying all through the air. In fact, these men whom they are finished with their work at night are quite red, or white, or black, as the case may be, according to the different ores they are emptying.

5194. But, of course, that exposure to dust from the ores would be common with railway porters and everybody who handled the ore from the time it is got out of the earth till it is melted; is not it rather a wide issue that?—Well, railway porters and others would not be affected; it is only when the ore is being emptied out of the waggon on to the bogie, or from the bogie into the barrow for the furnace, and whenever the ore is discharged that this dust arises.

5195. What ores are they that give rise to this chiefly?—Mostly Spanish ores.

5196. Iron ores?—Yes, Spanish iron ores.

5197. These, at all events, are the worst?—Yes.

5198. Then you are not dealing with any other ores except iron ores?—No, and limes.

5199. There is no other material but this iron ore you are dealing with?—And limes. We have various limes; it takes the ore, the lime, and coal to constitute the pig-iron.

5200. That lime is not silicious. It is said by some people that it is only the silicious and the metallic dust that does the harm?—Yes.

5201. Certainly some dusts, as you are aware, do not seem to do people very much harm. I daresay the doctor will agree with that, but we will see what he says to that presently; have you any definite reason to think that there may be elements within the lime that cause the disease, apart from the iron ore?—No, none. I think it is the lime and the whole dust combined.

5202. The lime alone probably would not do it, because the limekiln men would be all getting it?—Yes; but the proportion of lime we use is very small, compared with the other material that comes in. The quantity is something like 21 cwt. per charge; that is composed of 15 cwt. to 17 cwt. of iron ore and the remainder of lime and ore brickettes to make up the 21 cwt.

5203. But so far as you know, it is probably the silicious iron ore and the metal particles that are causing the harm, and not the lime; I do not wish to commit you to any statement that it is not the lime, but, so far as you know, is that the case?—It may be a theory, so far as I am concerned, but I think that the lime is a contributory cause to the whole thing.

5204. How can you know that if they are breathing an atmosphere of iron ore and lime; you could not say from mere appearances which was doing the evil?—I say the whole thing is doing the evil.

5205. I agree that it is our duty to put down definite diseases and definite causes, and if the lime causes the disease, we must put down lime?—Well, I cannot say lime is the sole cause.

5206. Well, then, you say further that there is pneumonia from inhalation of basic slag dust?—Yes.

5207. What have you to say upon that?—I now put in a return of our tables for last year. (See Appendix, page .)

5208. How many members have you?—5,600.

5209. How many deaths were there out of the 5,600 altogether; there are 32 on which you paid claims?—Yes.

5210. Were there others on which you paid claims?—We pay on 80 per cent. of the deaths.

5211. But what kind of death is it you would not pay a claim for?—We pay claims on all deaths, but after a member of our society gets a certain amount in arrears then he is barred from the death claim, and because of that we do not pay the full 100 per cent. of our members' death claims.

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5212. Out of 32 deaths, there are five caused by cardiac failure, nine by pneumonia, one heart disease, and three phthisis?—Yes.

5213. What are the ages of those men at death? You could give us that?—Yes, I can give you that; we have the death certificates in the office.

5214. These are taken from the death certificates of the doctors?—Yes.

5215. That gives you a little over half as much as the total deaths on which you paid from other causes?—Yes.

5216. Are these men who are engaged in loading the trucks engaged in that exclusively all day, or do they do other work?—They are mostly engaged in emptying the trucks.

5217. But they will be engaged all day in doing it?—Yes.

5218. I suppose there is only a certain limited number of men in a works who will do the emptying of the trucks?—Yes.

5219. So you would not claim that others should be included in addition to the truck-emptying men?—Yes, I would say the whole of the men engaged, because while the truck-emptying men are immediately affected, this dust flies a certain way before it settles down again, and the others working in the vicinity, especially if there is wind blowing, and blowing in their direction, receive their full share of it, and sometimes more, because if the wind is very strong it is carried away from the men who are emptying it to those others.

5220. But you will admit that it may be expected that among this number of men, viz., 32, some of them would have died from pulmonary phthisis, if they had never been employed where there was dust at all; in other words, there is such a thing as phthisis not produced by dust—you see my point?—Yes.

5221. It is a disease which is known apart from dust?—Yes. I cannot suggest a course which would meet that point. I think I will leave that to the doctor.

(Dr. Wyper.) All we can say is that the deaths from phthisis greatly exceed the average in other occupations.

5222. (Chairman to Dr. Wyper.) I suppose you would go on to say that it would be possible to tell the difference between a man who had died from consumption caused not by dust and a man who had been killed by consumption caused by dust?

(Dr. Wyper.) Well, in a *post-mortem* examination, if it is a fibroid form of phthisis which is brought about by dust particles, we can distinguish between death due to long-continued inhalation of dust particles and death due to an ordinary phthisis.

5222A. (Chairman to Witness.) I should like to know with regard to these three men who died of phthisis, if you can show that they were particularly engaged in loading. I suppose you can give us their occupation?—Yes.

5223. Were they specially engaged in unloading?—I cannot state that positively, but I can find that out and forward the information.

5224. What I mean is this: that while I can see the reasonableness of your demand in a true case of dust phthisis, it seems rather a large order to include everybody who happens to be engaged at the iron works, and that, too, in the case of a disease such as this, in which it is so difficult to say with certainty whether it is due to dust or not. Is it not rather a large order to include all these men as subjects for compensation in respect of this disease?—I see your point.

5225. While one might concede that the men directly exposed to the dust and who have got the disease should be compensated, it seems a large order to include every iron and steel worker in Great Britain. Do you not think it would be possible to distinguish so that only the men engaged in loading or unloading, or something of that sort, who caught the disease, might be included within the benefits of the Act; I would like your view on that—you will see the necessity of being reasonable, of course?—Well, our trade is a very young trade, as you are aware, and I have none of the medical statistics that are acquired in almost every trade except our own, so it is rather a difficult matter to give one's opinion on.

5226. Of course, if it turns out in the future that everybody engaged in the trade was exposed continuously to the dust, that may make a difference, but we can only deal with things that come before us now?—Yes.

5227. It strikes me as rather a large order to ask that everybody, whether engaged in loading or not, must be put in, because some of the dust may be blown across them?—Well, there are two classes of men I am strongly of opinion should be put in, and these are the men who are handling these ores, both emptying and loading into the bogies which are taken up the hoist and put into the furnace, and also the men in the gas department, both in iron and steel works.

5228. What do they do in the gas department? How do they handle ores?—They do not handle ores; they handle the things to make gas with.

5229. Please confine your attention to the ores; the coal would be different?—Yes.

5230. Are these two occupations?—There is only one occupation if you are going to confine the matter to the ores.

5231. Loading and unloading?—Yes, that is really only one occupation. It is the emptying and the loading into the bogies for taking up into the furnace.

5232. Well, it strikes me that the most that can reasonably be asked is that the men who are loading and unloading the ores should be included within the benefits of the Act as being particularly liable to contract this special disease, due to the nature of their employment, and I am anxious to know whether you would agree with that?—I quite agree. I think that would be sufficient in the meantime till we get better statistics, because we have not been going into this. If we had known this was going on, we would have been better prepared.

5233. You are not prevented from asking in the future that other persons engaged in other occupations in the trade may be included, if you find the evil exists also in these occupations?—Yes.

5234. May I say that the case you present, without prejudice to what it may be in the future, is the unloading of ores in connection with steel and blast-furnace works?—Yes, and the filling.

5235. The filling of bogies?—In the first instance these ores come in in waggons or trucks. There is one class of men who do nothing else but empty the ore on to the bing or heap. These men's duty terminates there. Then there is another class of men come forward with huge iron bogies that hold 21 cwt., and they fill 15 cwt. or 17 cwt., as the case may be, into the bogie, and then get the lime in along with it. It is then all taken from the bing and put into the furnace. It is flung with that dust into the barrow or bogie, and there is much dust flying about when that is done.

5236. These are the two classes of men we have to consider?—Yes, in this instance.

5237. Now we will go on to the gas-men. They are producer gas furnaces?—Yes.

5238. Mostly with coal?—It is mostly dross in modern gas-producing plant—what are called nuts.

5238. Does that slag contain silicious dust—the stuff you say is emptied in?—No, it is coal.

5240. But it is more than the coal?—It is washed, clean coal—nuts.

5241. There is no evidence of clean, washed coal producing a dust that gives men phthisis?—No, but there are fumes that come out of the gas-producing plant when the men are operating the plant.

5242. That is carbonic oxide?—It is mostly tarry vapour.

5243. Would that cause phthisis?

(Dr. Wyper.) Yes, it would.

(Chairman.) Coal dust alone does not appear to produce phthisis.

(Dr. Wyper.) No, it is not a common cause of phthisis.

5244. Then there is basic slag dust; the basic slag men are all under your society?—No, not the basic slag men, but the men that are working in connection with the manufacture of basic slag.

5245. But you have put basic slag dust down?—

- Mr. J. Gavin.* Well, if we have done that we have taken the term from the circular.
- 17 Jan. 1907. 5246. Never mind what you put down, but tell us in your own words what is meant. Perhaps the doctor will tell us?—Yes, he will.
5247. Very well. I am merely going through the points. We want all the light you can throw on them?—Yes.
5248. The dilatation of the heart, leading to heart failure—what class of men get that?—We find that general all over the members.
5249. I am rather afraid that is not a special trade disease; it seems to me to be the general lot of humanity?—What I mean is that we have returned five from cardiac failure, and I presume that is the point you are dealing with now.
5250. Of course it would be necessary to show that the cardiac failure was a real trade disease, apart from being a disease which is incident to all the occupations of the human race. You see, we are not dealing with every disease a man may die of?—No.
5251. We are dealing with an industrial disease, and therefore it is necessary to show, if you are going to put cardiac failure down, that the particular work of some men gives rise to some special form of cardiac

failure, or may be called a disease peculiar to that trade; you see what I mean?—Yes.

5252. And I am trying to get your view on that point?—I am afraid the doctor will have to speak to that. I am not in a position to say; but, so far as the cases we have returned are concerned, we show that they are general—they are not confined to one particular class of men in the trade.

5253. But that it runs generally through the whole of iron and steel works?—Yes.

5253*. That I think exhausts your list?—Yes.

5254. (*Dr. Legge.*) I am not quite clear. You speak first of the illness due to the inhalation of the blast-furnace slag dust?—Well, if I said slag dust, it should have been ore dust.

5255. You are not referring then to the dust that collects in the flues of the blast-furnace plant?—No.

5256. Do you know what I mean?—Yes, I quite follow you. These men are employed once a week or so cleaning that out, but there has been no question raised on that particular point.

5257. No complaint is made about that as causing fibrosis of the lungs?—Well, the time employed in these flues is so short that we have had no cases.

Mr. WILLIAM WYPER, M.B., CH.B., called and examined.

- Mr. W. Wyper, M.B., CH.B.* 5258. (*Chairman.*) You are a practitioner—in what locality?—In Motherwell and district.
5259. Do you occupy an official position of any sort?—I am just a general practitioner, and I am Medical Officer to Dalzell Poorhouse; that is the only official position I hold.
5260. And you are medical officer, are you, to some steel works?—No, not to any steel works.
5261. But to the men's union; do you occupy any position of that kind?—No, nothing of that kind.
5262. You have had a considerable practice, I suppose, among the steel-workers?—About ten years in Motherwell and Kilwinning, down about Eglinton Steel Works and Dalmellington Iron Works.
5263. Are you medical officer of any benefit society?—One society, in which there is a good proportion of steel-workers.
5264. You are not medical officer of the same society of which Mr. Gavin was speaking, among whom the 32 deaths occurred?
- Mr. Gavin.* We have no special medical officer.
- (Chairman.) (To Mr. Gavin.)* You just have doctors here and there?
5265. (*Mr. Gavin.*) Yes. But you have been employed by the society?—Yes.
5266. You know of these deaths?—Yes, I have been informed.
5267. We will take the heads that Mr. Gavin has brought forward. There is poisoning from noxious vapours, noxious vapours as an exciting cause of bronchitis and acute pneumonia and consumption?—Yes.
5268. That is carbon monoxide, is it?—Chiefly, and the gases given off. Generally there are a lot of tarry products. Of course, the poison is carbonic oxide, but that occurs chiefly amongst the blast furnace men, and I suppose you are not dealing with them just now.
5269. We are; we are dealing with every industrial disease?—In blast furnaces you may get an escape of carbonic oxide from waste gases for heating the air of the furnace.
5270. But that would already come within the Act?—So I have learned.
5271. Have you ever known permanent results from poisoning of that kind?—No, no direct permanent results.
5272. Indirect permanent results?—Undoubtedly. What I wish to state about gas-men employed in those steel works is that they very often suffer from the effects of gas inhalation.
5273. Carbonic oxide gas?—Yes, along with the tarry products. That is when they are regulating the feed-

ing of the gas producers or stirring up their furnaces or breaking clinkers, as they call them—that is, coal that has all come into a piece. They have got to break that up, and that causes a lot of smoke and gases to be given off.

5274. What are the effects?—Very often we get them suffering from acute bronchitis as the result of that.

5275. Of course, again, a man may get bronchitis without having been exposed to that?—Yes.

5276. It is difficult to say because a man has been shovelling some coal and gets bronchitis that the latter is necessarily the result of the former?—Yes, but what I mean to say is you get more bronchitis and more pneumonia amongst these workers than you do amongst ordinary individuals.

5277. What is the percentage that you get amongst these workers?—Well, I can only quote Dr. Oliver, Professor Oliver, of Newcastle.

5278. On the "Diseases of Occupations," I suppose?—Yes.

5279. Would you kindly tell us what he says?—I could not tell you the page, I am sorry.

5280. What is the heading of the chapter?—"Iron and Steel Workers." He does not mention gasmen particularly, but he mentions iron and steel workers. He says: "At the census of 1891 more than 200,000 workers in iron and steel above the age of 15 years were enumerated, but the number had decreased since the preceding census by 2 per cent. The labour of iron and steel working is heavy and exhausting. The operatives, whether at the blast furnaces or at the rolling-mills, whether puddlers or moulders, are exposed to intense heat, as well as to great vicissitudes of weather, for most of their work is done in the open air, or at any rate in outdoor sheds, unprotected from colds and draughts. The men are for the most part sturdy and of powerful build, the arduous nature of their occupation making it impossible for any but the most vigorous to follow it. In spite of these natural advantages, however, statistics show that iron and steel workers are by no means so healthy and long lived as they ought to be. The death rates of these operatives are higher than the corresponding rates among occupied males generally, and also higher than the rates of other metal workers, at all stages of life up to 65 years. They have a comparative mortality figure of 1,301, which is higher than that of occupied males, as a standard, by 37 per cent. Ironworkers suffer more severely than do other occupied males from influenza and from diseases of the nervous, circulatory, respiratory, digestive, and urinary systems, their mortality figure from diseases of the lungs being more than double the standard figure, and that from phthisis also greatly exceeding the average. Since 1881 there has been a considerable increase in the mortality of iron and steel workers. The increase has affected both

divisions of the working period of life, but has been far the greatest among men over the age of 45 years."

5281. That is not the passage, is it?—That is not the point yet.

5282. What we are on is permanent effects caused by breathing carbonic oxide apart from the temporary ones, chronic illness?—What I was going to lead on to was that there are repeated attacks of bronchitis.

5283. But bronchitis is not produced by carbonic oxide poisoning; we must try to avoid confusion. Carbonic oxide poisoning is what we are on now?—I cannot say that there are any permanent effects.

5284. That is one noxious vapour; now we want to get to the other noxious vapours?—Well, I mean the gases generally.

5285. But we cannot deal with gases generally; there must be some specific disease?—The gases are an exciting cause of death.

5286. Yes, there is some evidence in other trades that under certain conditions carbonic oxide will produce a permanent disease; it is not very strong, but there is some; at all events, the gas would very likely have to be associated with other vapours, because the disease is not very common?—No, it is not common.

5287. But there is some evidence to this effect, we have got it all fully noted; but we must take them vapour by vapour?—Yes. Well, so far as that is concerned, there are no permanent evils that I am aware of caused by carbonic oxide gas alone.

5288. Can you point to any other noxious vapours that have permanent ill effects?—No, these other vapours mentioned in the circular are not given off in the manufacture of steel or iron.

5289. It would generally be carbonic oxide, I suppose, that would be given off; it is believed to be the great thing?—It is the great thing, but unless as a predisposing cause of these other diseases, I cannot speak for anything further than that; as to the absolute cause, I can give no evidence on that point.

5290. You see it is hardly enough simply to say men have a higher death rate in a particular trade; for our purpose you have got to set the thing specifically down as poisoning from this and poisoning from that?—Yes.

5291. Now, we shall turn to the fibrosis of the lungs from inhalation of silicious or metallic particles. You need not labour the point that silicious particles will affect the lungs, because it is plain, I think, that this point is quite conceded?—That is agreed.

5292. I should like to know how far these men loading and unloading are exposed to this dust, and how far it affects their lungs in that particular case; you must remember that hackney coachmen are exposed to dusty roads, to silicious particles?—Yes. I understand; there is a large percentage of what we call fibrosis of the lung or fibroid phthisis amongst steel and iron workers.

5293. Yes, but among those men loading waggons; it is chiefly the waggon loaders who are affected, is it not?—Chiefly that class of men.

5294. That is the dangerous occupation?—That is a very dangerous occupation, in my opinion.

5295. What would be the proportion of men who suffer from this disease among loaders and fillers of these buckets that are to go into the furnaces?—I do not think it would exceed about 3 to 5 per thousand; there is not a great percentage.

5296. What is the percentage of the ordinary population who take phthisis?—Well, for that form of phthisis, viz., fibroid, 1 per thousand.

5297. We are speaking of phthisis in general, because three out of the 32 deaths mentioned by Mr. Gavin were from phthisis in general?—We are speaking of fibrosis of the lung, or fibroid phthisis, and consumption, or caseous phthisis, as we call it; there is a difference between them.

5298. What proportion of the population get phthisis of any kind at present? You have told us the proportion of deaths from phthisis among iron and steel workers is larger than that of the general population; what is the figure for the general population at present?—About 3 per thousand.

5299. That die from phthisis?—That die from phthisis. Of course, it depends on your population, if you have a young population. In Motherwell, for

instance, we have a big percentage of deaths amongst infants—children—from phthisis.

5300. But take it from the population between 20 and 50?—Well, I think it would be the percentage I stated.

5301-2. Three per 1,000?—Yes, I should say so.

5303. What is your percentage here amongst those workers?—Well, I would say about 10 in 1,000.

5304. It would be larger?—Yes.

5305. That is chiefly among these loading men?—Yes.

5306. Supposing we could see our way to protect these loading men, whose occupation Mr. Gavin has described to us, I suppose that would put an end to the greater part of the evil, as far as we can see, at present?—Well, it would amongst that class; of course, it is fairly common amongst the other steel workers as well, from the inhalation of, I suppose, dust particles.

5307. But we must not suppose too much, we have got to go upon facts; in your own mind would you be disposed at present to include within the benefits of this Act in respect of this disease any workers beyond those loaders and fillers at the heaps?—I can only say that amongst those loaders I am sure there will be double the number affected as compared with the other workmen in an iron or steel works.

5308. I frankly confess, as far as I can see, that the case that is made out is really a case for those men engaged in the loading and the unloading operations, which Mr. Gavin has described, but I do not see that the evidence goes further than that?—No, not for putting the disease down generally as an industrial disease; I do not suppose you can.

5309. I suppose, speaking as a doctor, you would have no very great difficulty in distinguishing the fibroid cases from cases that were clearly tuberculous?—No, we have not much difficulty.

5310. Now take pneumonia from inhalation of basic slag dust?—Well, this is chronic pneumonia.

5311. Mr. Gavin explained to us the grinding of basic slag for making manure?—There are no grinders out our way, and of course there is not much of that basic slag dust, because it is chiefly the other process.

(Mr. Gavin.) It comes off in the rolling of the plates—fine dust.

5312. (Chairman.) Are you able to fix special cases of that?—Yes.

5313. How far can we hammer that home, as it were—attribute pneumonia to the inhalation of this particular dust?—Well, of course you cannot as a direct cause; I do not know about the indirect.

5314. I think you must be able to say that it is this occupation and this dust that causes the pneumonia distinctly; one may say anything contributes, a thousand things contribute to a disease?—You cannot have acute pneumonia without the pneumonia germ; but what I meant to say is that the inhalation of those particles deteriorates the mucous membrane and the air passages to such an extent that a pneumonia is often set up, is more frequently set up amongst these workers than you would get amongst other workers.

5315. What is the particular process—rolling of steel plates?—Yes.

5315*. That is all?—Yes.

(Chairman.) (To Mr. Gavin.) Is that all?

(Mr. Gavin.) Yes; of course the rolling of steel plates covers a great deal; it covers the heating and also the shearing; when we speak about rolling, it covers the whole of the work in connection with the manufacture of steel plates.

(Chairman.) But would the heating of the steel plates cause these dusts to come off?

(Mr. Gavin.) Not the heating; but the heaters and the rollers are all working together, and they all suffer from the same effect.

(Chairman.) Of the nine cases you have given us, you will get the particular work these particular nine men were doing?

(Mr. Gavin.) Yes, I can send it on to you.

(Chairman.) It is necessary to prove the case very clearly.

Mr. W.
Wyper,
M.B., CH.B.
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(Mr. Gavin.) I find the doctors are not very particular about giving us full information about the cause of death; it says distinctly on the top of the death certificate "State the duration of the illness," and they invariably omit to state the duration of the illness, although that is on the top of the death certificate.

(Chairman.) It puts us in a great difficulty; you see yourself the difficulty that we are in?

(Mr. Gavin.) Yes, I can let you have a copy of the death certificates of these nine men, the trade that they were employed at, and the duration of illness if stated.

(Chairman.) And the character of the employment if you can get it?

(Mr. Gavin.) Yes.

5316. (Chairman.) I suppose we may take it you would agree with Mr. Gavin's opinion that cardiac failure is general?—It is general amongst those that have strenuous labour; it is common in shipbuilding yards, and amongst blacksmiths, and others.

5317. We can hardly call that a disease specific to an industry?—No, it accompanies all heavy industries.

5318. You will understand that what the Committee have to deal with are specific diseases due to the nature of the employment. The fibroid consumption is a specific disease; we know what we are at there perfectly?—Yes; that is also brought about by the inhalation of the slag dust.

(Mr. Gavin.) It is ore dust.

(Witness.) It is the ore we mean.

(Mr. Gavin.) Regarding the statement about slag, there is a certain amount of slag used at all blast furnaces, and the particles get into the men just as well from the slag dust as the ore. We do not use so much slag as we use of the ores, a very small proportion, and the slag comes principally from the puddler furnaces.

(Dr. Legge.) (To Mr. Gavin.) When you so use it is it put into the furnaces to be melted up?

(Mr. Gavin.) Yes, they burn it up with the ores and the lime, and the coal too.

(Dr. Legge.) That is covered by the occupation of the men you have already dealt with?

(Mr. Gavin.) Yes.

(Chairman.) The claim in respect of the loading is a very clear claim, and one can understand it clearly; the other claims seem to me to be a little "woolly," if I may use the expression.

(Mr. Gavin.) Yes.

5319. The loading and the unloading—that we see clearly, at least, I do; the others appear to me rather more vague. Of course, there is poisoning from carbonic oxide gas, that is another point that seems to be clear, but the others appear rather vague. Can you assist us?—Well, when we are tied down as we are, we must agree, of course, that all those other diseases we are speaking of are not just confined to steel workers; all I can say on that point is that amongst steel workers and iron workers there is a larger percentage of these diseases.

5320. And that has to be considered?—Yes.

5321. (Dr. Legge.) With regard to the poisoning by carbon monoxide, have you had under treatment cases of paralysis which you in any way associated with the employment?—No.

5322. Then with regard to the pneumonia, have you read the article in Professor Oliver's book by Dr. Stewart on pneumonia due to basic slag inhalation?—Yes.

5323. Have you read the article in the book?—I think I have, but I do not just remember the particulars.

5324. With illustrations of the nature of the dust, the minuteness of the particles; I understand from Mr. Gavin that a little basic slag is used in the works, that it is burned up with the other material?—Yes.

5325. But in that case it is put on in cakes; it is not put in the form of a powder on to the furnace, is it, so that there cannot be any of the same fine dust that is referred to there?

(Mr. Gavin.) I would like to make a correction. It

is not basic slag that we use; I said it was puddler's slag that we used, which is not basic slag.

(Dr. Legge.) (To Mr. Gavin.) But it is put in a cake into the furnace?

(Mr. Gavin.) Yes, it is not ground.

5326. (Dr. Legge.) Is pneumonia recognised as a common disease in blast furnace works—I mean steel works?—In steel works, very much so.

5327. And when you are called to treat a workman who is suffering from ordinary pneumonia, do you associate it with his work?—Well, of course, we just consider his work as a predisposing cause; speaking scientifically, we cannot say their work is the cause of that.

5328. In the village in which you practise what population is there?—Well, in the district there will be, roughly, 40,000.

5330. And of those how many will be working in the iron and steel works?—Combined, I am sure there will be 3,000, anyway.

(Mr. Gavin.) It is the principal industry for the whole of the men, that and the mining included.

5331. (Dr. Legge.) How many of these nine cases that are recorded as having died from pneumonia come out of those 3,000; how many did you see last year?—These are not from Motherwell district particularly.

5332. I wanted to find out how many came from this particular district which you had yourself seen?—I have no statistics on that point at all.

(Mr. Gavin.) I may point out that the doctor is not a doctor for an iron and steel work who would come into immediate contact with these men.

(Witness.) I do see a lot of them.

(Mr. Gavin.) He is a general practitioner, I understand.

5332. (Dr. Legge.) In general practice have you had any cases of pneumonia that you could directly attribute to iron or steel works?—Not directly.

5333. Can you give us an estimate during the ten years you have been in practice how many cases you may have seen; does it occur in epidemics at all?—No, I cannot say it occurs; it is more common, of course, as it is in the town generally—it is more common among steel workers, and so on, at this time of the year—January to March—than at other times.

5334. In the spring?—Yes, but, of course, we get odd cases all over the year.

5335. Have you heard of districts in England where pneumonia is considered endemic, very prevalent?—Yes, I have heard down in Middlesborough, where it was once apparently endemic.

5336. Is your district round Motherwell an analogous district to Middlesborough?—Much similar, I think; I have never been to Middlesborough, but I think there is a similarity.

5337. Blast furnace centres?—Yes, both steel centres.

5338. (Mr. Gavin.) I understand that our town is one of the healthiest towns in Scotland?

(Witness.) Yes, it is a fairly healthy town.

5339. (Dr. Legge.) Have you ever been able to examine the lungs of a workman who has died from this form of fibrosis?—Yes, we have opportunity occasionally; of course, that is chiefly in the poorhouse, of which I am medical officer, and it is there that I see a number of these cases of fibrosis of the lung; it is really there more than outside that we see them. It is in prematurely old men—men who have probably had that disease for years, and it has been treated as bronchitis, so of course there we have an opportunity occasionally of making post-mortem examinations, but outside we have not.

5340. What are the conditions that you have found?—You get the usual patches of consolidation of lung, with dilated bronchial tubes.

5341. When you say the usual forms of consolidation do you mean like pneumonia or like cartilage, or what?—No, as we get in phthisis I mean; that is, you get it in patches. Of course, in the ordinary consumption, in the proper sense of the word, often you may get the lung consolidated somewhat like a pneumonia, in early cases; in the later cases you get cavities, but in that fibroid phthisis we get amongst these workers you get the lungs somewhat analogous to liver

at parts, consolidated, and, of course, pigmented with either black pigment or red; if they are working amongst those ores you get it pigmented with ore, reddish ore particles, and then in addition to the consolidation of the lung you get a compensatory dilation of the bronchial tubes in endeavouring to make up for the loss of lung tissue.

5342. What is it, do you think, that generally causes the death of persons with fibrosis?—Well, the constant inhalation of these metallic particles sets up just a chronic inflammation of the connective tissue of the lung, and the active tissue shrinks in, and really the lung becomes practically useless; they have less breathing capacity.

5343. You do not find cavities?—You do not find cavities of lung, but of course you get dilated bronchi, which simulate cavities.

5344. You do not think that these men died from consumption engrafted on to their disease?—No, it is not brought about by the tubercular germ; it is more what you call a fibrosis of the lung.

5345. You have not said much about the chronic bronchitis that these men might get. I thought that that was much more likely to result?—I should have mentioned that that is common amongst these workers that we were considering primarily, due to these gases.

5346. It is not so common as this fibrosis from the inhalation of the dust?—Oh, yes, it is very common.

5347. Does that, do you think, shorten their lives?—Yes, it does, but not to such an extent as fibrosis.

5348. They are not permanently incapacitated by this chronic bronchitis?—Well, they are not able for heavy work, they are not able for their usual work, and they are certainly old men before they are fifty; they are not able for much work after forty-five; that is how they drift into poorhouses.

5349. (*Professor Allbutt.*) Have you seen many cases of pure fibroid phthisis?—Yes, I see a great deal of that.

5350. In life?—During life.

5351. And occasional post mortems, I suppose?—Yes.

5352. You do not get many post mortems?—No, not half a dozen in a year.

5353. The whole of your post-mortems amount altogether to half a dozen in a year?—If we are anxious to get them.

5354. You are not speaking of getting half a dozen post mortems of fibrosis?—No, I mean generally speaking.

5355. You have said, I think, that there is no great difficulty in diagnosing fibrosis?—That is so.

5356. The disease may last for years, I suppose?—Yes.

5357. If such a man consults you over a period of six, eight, or twelve years, what sort of symptoms does he complain of?—They generally tell you if you are seeing them for the first time that for years they have had bronchitis, the usual cough and emaciation, and when they do cough, in the morning, probably, they spit up great quantities—ounces—of vile-smelling stuff. I have examined that bacteriologically, and, as a rule, it is mixed with all kinds of germs; they inhale all kinds, and it is very difficult—in fact, you never do get a pure culture of tubercle bacilli in these cavities, and very often it is absent, and yet we have no doubt it is phthisis.

5358. There is also tuberculous phthisis?—Yes.

5359. You have no difficulty in distinguishing it at all?—No, we have not any difficulty in distinguishing the two; in that form you readily get the tubercular germ—in the gaseous phthisis.

5360. Is the fibroid phthisis fairly distributed among all the classes of men, or is it common among particular classes?—Well, it is more so amongst those workers loading and unloading material at those works.

5361. And you would go so far as to say that among them it is fairly common?—Yes, it is fairly common amongst them.

5362. I suppose the process in an ordinary man lasts 10 to 20 years?—It might go on for 10 years; I cannot say for 20.

5363. It is about a 10 years' process?—Yes; they may be able to work for years, then they probably lie off for a number of years.

5364. It affects both lungs?—Yes, generally.

5365. And those who fall into the ordinary tuberculous phthisis you take out of the category of dust phthisis?—The Chairman made me admit—well, he did not make me admit, but I admitted—that this disease is more prevalent amongst them.

5366. You see a good deal of the tuberculous phthisis also?—Yes, I see plenty of that.

5367. Considering the particular purpose of this Committee, can you divide into two separate classes the tuberculous and the fibrous?—Yes.

5368. Would you put it that they are very distinct?—Yes, quite distinct.

5369. And you say that the tuberculous phthisis is likewise more common among those men than among the general population?—Yes, tuberculous phthisis is more common amongst steel workers generally than amongst the general population.

5370. That is to say, leaving out the dust cases?—Yes, I am leaving them out.

5371. Among the dust workers is tuberculous phthisis more common than among the general population?—Yes, it is more common; they are above the average amongst younger workmen.

5372. Is tuberculous phthisis of the ordinary kind more common among those who load this dusty stuff than it is among those engaged in other parts of the manufacture?

(*Mr. Gavin.*) We are not dealing with the loaders, Mr. Chairman, in connection with the steel works; we have not raised the question of loaders.

5373. But you have a certain number of patients who you say were engaged in the whole of these departments?—Yes.

5374. And among them there is a particular set who work in the dust?—Yes.

5375. You say that over the whole of those people, in whatever department they are engaged, tuberculous phthisis is more common than outside?—Yes.

5376. Then is it much more common among those who work among this dusty ore than among those engaged in other departments?—Well, the fibroid form.

5377. I am asking about the tuberculous?—It is more common amongst gasmen than the general body of the men.

5378. The gasmen, who are exposed to carbonic oxide?—The gas producers; there is carbonic oxide there, too.

5379. Do you mean those persons who breathe gases which are simply irritant?—Yes, it is more common amongst those than the others.

5380. Do you think it is more due to the effects of any irritating gas than to a specific poison in the gas?—Yes.

5381. It sets up bronchitis, I suppose?—Yes, sets up a local irritation, and that makes a suitable nidus for the disease.

5382. Can you go farther and say that the tuberculous disease is very much more common among those ore workers; is the difference very striking?—Yes, there is 50 per cent.

5383. Of the tuberculous kind?—Yes.

5384. If you were to put the tuberculous and the fibrosis together, it would make a still larger difference?—Yes.

5385. Then you would say it is a very heavy incidence, the two together?—Yes, it is a large percentage.

5386. What about their habits as to drink?—There is that to be considered, too. My own experience amongst a good many of these gas workers is that they drink fairly heavily.

5387. I suppose, owing to the irritation by the gas, or whatever it may be, they want a slake?—Yes, to slake their thirst.

5388. Then you spoke of chronic pneumonia; but chronic pneumonia is a thing almost unknown?—That is really what we have been speaking about. Technically, we speak of it as chronic pneumonia.

5389. Is that the term you generally give it?—In the medical text books it is spoken of as that.

5390. What distinction do you draw between mere chronic bronchitis and this chronic pneumonia?—Well, in chronic bronchitis, of course, the lining of the

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bronchial tubes is affected with a compensatory emphysema of lung tissue.

5391. Persons who are continually exposed to weather, wet and so forth, as these men are, I presume are very apt to get bronchitis, whatever the trade be?—Yes, that is true.

5392. Therefore we shall have to make a considerable allowance for what we may call ordinary bronchitis?—Yes.

5393. Are you clear in your own mind as to the difference, speaking fairly broadly, between bronchitis which would be produced by exposure to weather and wet, and this chronic pneumonia or fibroid phthisis; are you clear as to the difference?—Oh, yes, quite clear.

5394. I think it might be well to give us a few points of difference between the two; for I mean you will scarcely claim that chronic bronchitis is specific in any way to a trade?—No, I can only say that as a matter of observation it is more common amongst steel workers.

5395. Perhaps you will just give us the points of difference between ordinary chronic bronchitis and fibroid phthisis—ordinary chronic cough and an emphysema with fibrosis?—Well, of course, we can differentiate between chronic bronchitis and fibroid phthisis, because in this fibroid phthisis there are changes in the lungs.

5396. Recognisable by physical signs?—Yes. Chronic bronchitis leads to changes in the lungs also—viz., emphysema, where you have a dilatation of the lung vesicles, whereas in this fibroid phthisis you have consolidation of the lungs in patches.

5397. You were to give us the physical signs?—In chronic bronchitis you would get the up and down movement of the chest in breathing—that is, the chest does not expand; then in this other form (fibroid phthisis) you would have flattening, probably at the apices; you would not have so much of the up and down movement, and the person would not be able to fill up the chest as a healthy man could; his lungs are all contracted away from the walls, and he cannot fill up his chest; then, of course, in both cases you would have breathlessness and other symptoms from want of lung tissue and respiratory surface; that is on inspection, while on percussion you would get probably a hyper resonant note where you had the chronic bronchitis, and in this fibroid phthisis you would have dulness at different parts of the lung.

5398. Considerable areas of dulness?—Yes, you would have areas of dulness of various dimensions.

5399. At the upper parts?—Probably all over.

5400. You mean in patches all over?—Yes.

5401. In the early stages of fibroid phthisis, I suppose these physical signs would be somewhat elusive?—In the early stages you could only judge by the

history of long illness, loss of flesh, breathlessness, and the character of the sputum.

5402. The breathlessness is out of proportion to the physical signs?—Yes.

5403. Can you tell us something about temperatures?—The temperature is no guide.

5404. You see fever occasionally?—It is no guide in diagnosis.

5405. You say that is no guide?—No; it might be normal just now, and may be up at night; if a lot of that sputum is lying fermenting, decomposing, that often causes it to go up; the temperature does not assist the diagnosis one bit.

5406. From what you have told us, then, it appears that you would be able to take out in several categories the cases which are "grit phthisis," as the phrase has been used, and tuberculous phthisis, which might have an independent origin, and bronchitis, which might be due to weather or to any other such general causes?—Yes.

5407. Alcohol may not have very much to do with this fibroid phthisis?—Well, it is certainly a contributory cause.

5408. (Dr. Legge.) Have you got any cases of this fibroid phthisis under treatment at the present time?—At the present minute I think I have one down in the Poorhouse.

5409. How many?—One.

5410. An advanced case?—Yes, fairly advanced—confined to bed.

5411. (Chairman.) What is that man's occupation?—He was a puddler in the iron works.

5408. (Dr. Legge.) Have you got any cases of this who have been at that work, but I have one or two patients in Ireland at the present time suffering from ordinary consumption who worked at these gas producers.

5413. (Dr. Legge.) Is this unloading of the ores very extensive throughout the kingdom? What will be the number of men employed in that operation in the United Kingdom?

(Mr. Gavin.) I would not like to guess, but one thing I can tell you is, that wherever there is a blast furnace or a pig iron manufacturing plant, these ores are used; they are used all over England and Scotland; the iron is chiefly made from these ores.

(Chairman.) I gather that it is this unloading and loading that is the real point of Mr. Gavin's case, at all events at present.

(Mr. Gavin.) Yes, and in the gas department, too.

(Chairman.) The carbonic oxide.

(Mr. Gavin.) Yes.

(Chairman.) These are the two real points we have to think of, Mr. Gavin, at all events at present.

(Mr. Gavin.) Yes.

Mr. ROBERT BROWN, called and examined.

Mr. R. Brown. 5414. (Chairman.) Whom do you come on behalf of?—The Scottish Miners' Federation.

17 Jan. 1907. 5415. How many miners does that Federation embrace?—53,000.

5416. Out of how many altogether in Scotland?—We always reckon that there are about 70,000 men employed underground.

5417. And you are all underground men, are you?—Yes.

5418. You do not take in any surface men in your Federation?—There may be a few at some of the collieries.

5419. But there will be very few?—Very few.

5420. You are come before us to urge that beat hand and beat knee should be put down in the third schedule to the Compensation Act?—Yes.

5421. I suppose that by beat hand you do not mean every blister on a man's hand—not a mere blister such as a boy may get from handling a cricket bat?—I do not consider that to be beat hand at all.

5422. What would you describe beat hand as? Give us a clear description of it from a practical point of

view?—What we have looked upon as being beat hand is an inward bruise underneath the skin arising from handling a tool or something, and after a few days' time it develops and the pain starts.

5423. Does it suppurate?—Yes, it has to get relief.

5424. There is a lot of matter?—The matter gathers.

5425. There is a lot of yellow matter forms there?—Yes, and sometimes it will burst of its own accord if it gets time; other times it must be cut to get relief.

5426. You would not call it a beat hand unless some of the yellow matter formed there?—Well, that is usually what we call beat hand, when it forms a gathering.

5427. And about beat knee, is there a gathering there, or what is there in beat knee?—It is something similar, but there is more than one form of beat knee. I have suffered myself from it, where it was not inwardly. I had a slight pustular swelling on the surface; it was very little to begin with, but the pain was very severe, and ultimately matter formed at the place. I have been off myself for some weeks with that, not on my knee, but on the top of my foot. I attributed that to something getting, perhaps, between the lace of the

foot and the skin, and the irritation was set up through that case; it was not like a boil, but more like a little pustule with water in it, and when it was pricked you did not get relief, but it got deeper seated.

5428. Is that different from the sort of affection that any man might get in ordinary life walking about the streets of Glasgow?—I think it is more liable to result from the occupation, owing to some of the material getting between the shoe and the foot, or between the trousers and the knee, and setting up the irritation.

5429. That is not permanent; you can be cured of that by staying away and treating it properly?—Yes, but I have known it affect people for three or four weeks.

5430. At the end of that time it gets well again?—Yes, but in the beat knee it is deeper seated, and sometimes has more serious consequences.

5431. Have you ever seen cases of, or yourself had, what is known as nystagmus?—No, we are used to a naked light in our district, and any case I have seen of any person being troubled with nystagmus has been among men who have come from where they used the safety lamps, and they attributed any defect in their sight to having to use the safety lamps; but in the district I represent all our men work with the naked light.

5432. So you do not have much to say to that?—No, I cannot say that our men are affected with nystagmus at all in our district.

5433. (*Professor Allbutt.*) Your mines are quite safe?—Well, it is all the naked lights.

5434. You have no gas?—No gas to require safety lamps, and any man that I have met with in our district who complained of his sight had come from the districts where they had used the safety lamps, and attributed it to that cause.

5435. (*Chairman.*) I think that covers all you have to say?—Yes.

5436. (*Dr. Legge.*) You say there are two forms of beat knee, there is one a pustule and the other a

swelling?—Yes; well, of course, I never have attributed the pustule to being beat knee, but I know that is a form of accident that our men are liable to.

5437. (*Chairman.*) We must not treat every little thing as a regular miners' disease; the regular beat knee is a different thing from the pustule, isn't it?—Well, but the gathering takes place ultimately; it is a thing on the surface to begin with, it is another kind of beat knee, so to speak, and it arises from the work.

5438. If it never got any further than a pustule you would not call it beat knee?—No.

5439. (*Professor Allbutt.*) Do you understand that by beat knee we are referring not to injuries commencing with abrasions of the skin, but to bursitis, little cushions forming near the joint. Would you be satisfied with this definition of beat knee, or do you think it is not wide enough for you?—Of course, we have always considered that wherever the little pustules were seen the same results nearly always arose to the workmen from it.

5440. I do not think we have learned what the pustules are exactly, except that any abrasion may be fouled and form a pustule; but do you think there is anything characteristic about the abrasion?—I know myself that I suffered from it very severely on the top of my foot, and the pain was worse than even the ordinary gathering in the hand or foot, and so little was to be seen except a small pustule of a bluish colour.

5441. You would have to accept some medical definition about the beat knee, and if you wish to bring in any other disease that begins with the skin you will have to bring us further medical evidence?—I do not wish to press this; it is principally beat hand and beat knee that I wish.

5442. (*Chairman.*) You would not claim that every bad knee was necessarily a beat knee?—No, it may arise from various other causes.

5443. It is the beat knee as a specific industrial disease that we are dealing with?—Just so.

Mr. JOHN ROBERTSON, called and examined.

5444. (*Chairman.*) You are a miners' agent in Hamilton?—Yes.

5445. Whom do you represent here?—The Scottish Miners' Federation.

5446. You come with Mr. Brown?—Yes.

5447. You wish to put before us beat hand and beat knee, I think?—Yes.

5448. We have already had a description of the beat hand and beat knee, but I suppose you would not say that every time a person's hand or knee got wrong that that was beat hand or beat knee? It is a specific industrial disease you are dealing with?—Yes.

5449. And something peculiar to miners?—Yes.

5450. You would not call it a beat hand unless there was a gathering of matter, would you?—Well, it might not go that length, the hand might be swelled and sore, and it might not go the length of a gathering of matter.

5451. But there would be a gathering of matter, wouldn't there?—Well, I should think so.

5452. Because at present, as I understand it, you would not call it a beat hand unless there was a distinct gathering of matter?—No.

5453. And beat knee is equally clear, isn't it?—Yes.

5454. Then sprained wrist, that would be covered, wouldn't it, by the ordinary clauses of the Workmen's Compensation Act at present; that is an accident?—I do not think so.

5455. But if you sprain your wrist, that is an accident, isn't it?—Well, I do not think they get compensation for sprained wrists at the present moment.

5456. If it does not last the proper amount of time, but if you have a sprained wrist that lasts a month won't you get compensation?—I do not think so.

5457. Well, at all events, you could hardly call a sprained wrist a specific industrial disease of miners, I mean that might happen with a hackney coachman?—It might happen with any industry, but it is very common amongst miners.

5458. But it can hardly be called a miners' industrial disease?—No, if other occupations have it, it cannot be peculiar to miners.

5459. It is not peculiar to miners in the same way that beat hand is and beat knee?—No, that is so.

5460. (*Professor Allbutt.*) Are sprained wrists more common than sprains of any other part of the body?—Yes, in hewing the coal, or whatever material they are hewing, the nature of the substance may change, it may get harder or softer—I am speaking from experience—and when you go from a soft to a harder substance then it has the tendency to sprain your wrist.

5461. (*Chairman.*) Have you had any experience of men's eyes being affected?—My experience is mostly in the districts where the miners work with naked lights.

5461*. So you do not know much about that?—But in the district where I live they work with the safety lamps, and it is observable among the miners who have worked a long time with the safety lamps that there is a look in their eyes different from that in the eyes of the miners who are always working with the naked lights.

5462. Have you seen any case of nystagmus?—Yes, especially if the person had met with an accident to his eye. If a man had met with an accident to his eye, after he had recovered from the accident, if he had been working with the safety lamp his eyes are more liable to twitch. I have seen that.

5463. (*Professor Allbutt.*) Can you explain how it is that this twitching of the eye does not come on with the naked light?—Well, I could not. I have worked with a safety lamp, and you have to strain your eye.

5464. The position of the eye as regards the work must be the same. Do your miners work lying down?—Yes.

5465. Lying down on their haunches?—They change the position. If it is a part of their work they can do lying down they lie down, and if they can stand they stand, but in the thin seams they do all the work lying down.

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5466. I should have thought it was rather more the position of the miner in respect to his work than the kind of light that he worked with. It is none the less true what you say, and Mr. Brown said also, that it does not occur among your miners?—Not where they work with the naked light.

5467. As they all do here?—Yes—well, not all; in some of the districts they work with the safety lamp.

5468. And it is within your knowledge that there they do suffer from nystagmus?—Yes, as I have already said, when a miner has been suffering from an accident to the eye, and is getting better, recovery is more difficult; he is longer in recovering than the miner who has been working with the naked light, and there is, too, the quivering that you refer to.

5469. In those districts not very far from here, where

they work with the safety lamp, would the thickness of the seam and the character of the work be otherwise pretty much the same, and would the position of the miner be pretty much the same?—Well, no; I think in most instances where the safety lamp is used the seams are thicker, but there are thin seams where they are working with the safety lamp.

5470. You think, then, it is more the light than the attitude of the miner?—Well, I have worked with both lights, and, speaking as a miner, I thought I had always to strain my eyes more to see.

5471. The light is not good enough?—No, it is not so good.

5472. The light being dim, you have to strain the vision more?—Yes.

Mr. JOHN FOTHERINGHAM, M.B., C.M., L.F.P.S., called and examined.

Mr. J. Fotheringham,
M.B., C.M.,
L.F.P.S.
5474. (Chairman.) Are you a general medical practitioner?—Yes.

5475. In Glasgow?—In Motherwell, which is an industrial centre.

5476. Have you any connexion with any workmen's clubs or benefit societies or employers' associations?—The greater part of our practice out there is club work—that is, the workmen in the different works subscribe for a doctor; and I happen to be the medical officer to several of them out there, certainly the largest works.

5477. Several of the workmen's clubs?—Yes, the clubs in connection with the public works; all the workmen are members of these clubs.

5478. Do the employers subscribe to these clubs, too?—They do not.

5479. They are workmen's clubs?—Yes.

5480. And what trades do those clubs belong to—entirely miners?—Iron and steel workers.

5481. Not miners?—And miners also.

5482. Are the iron and steel workers and the miners in the same club, or do the iron and steel workers and the miners have separate clubs?—They have separate clubs; they are, of course, employed at different works.

5483. There are no joint clubs comprising both classes of men. No, I do not know whether you can call this a club altogether, because it is one of the regulations of the works that each man subscribes for the doctor; in Motherwell we might call ourselves works doctors.

5484. The men are compelled to subscribe, do you mean?—Well, that is one of the regulations of the works, and the men all do subscribe.

5485. One of the employers' regulations, is it?—It has gone on all over the country, both England and Scotland, for generations, that system of weekly deductions, which go to a medical man. The workmen have the choice, however, of the medical man, but the deductions are made by the employers.

5486. It is not a regular club; it is only a subscription for a medical man?—Yes.

5487. I thought you meant a benefit club?—It is not a benefit society.

5488. It is not for paying wages during disablement?—Oh, no; it is merely for medical attendance and medicine, that is all.

5489. You can give us, I suppose, information upon various forms of industrial disease?—Well, I do not know that I have a great deal to say, although I have a large experience amongst the workers—that is, iron and steel workers, and a good many miners.

5490. I would like to ask you about one or two diseases, one after the other. For instance, supposing we first take what I may call grit phthisis?—Yes; I have rarely ever come across it.

5491. But surely, if phthisis due to slag or other dust is common in your neighbourhood you will have seen it?—I cannot say that it is common in our neighbourhood.

5492. Not among iron and steel workers?—No; phthisis is not a very common trouble amongst iron and steel workers.

5493. We have just had evidence that there is an abnormal proportion of men who are said to die from it?—From phthisis—that is not my experience.

5494. Do you happen to know Dr. Oliver's book?—No, I do not.

5495. You do not know where he states that?—No. I am talking from my own experience.

5496. Your experience, then, is that iron and steel workers do not suffer in any abnormal way from phthisis?—That it so. I should rather say that the proportion is somewhat less. I think they are, on the whole, a very healthy class of men, provided they live well, live properly, and do not drink, as far as phthisis is concerned.

5497. We were told that the men who unload the ore from waggons for the making of steel suffer from phthisis owing to the dust that rises?—I have not come across much phthisis amongst them; it is comparatively rare—certainly not more than amongst the general community. I have not got statistics, but my impression is that there is even less, except amongst those iron and steel workers who drink, and, unfortunately, there are a considerable number of them who do that. The illness amongst them is not very marked, it is not very great. There are a few wrecks, but they are alcoholic wrecks, and I could not put alcoholism down as being an industrial disease.

5498. How about miners?—Miners are, in my experience, which extends to about 25 years, a healthier class of men considerably than they were at that time.

5499. I think that is generally admitted, but how do they stand as regards phthisis?—I think perhaps there is rather more phthisis amongst miners than amongst iron and steel workers; I should be inclined to say that.

5500. Would that be got from rock dust, silica rock dust?—No; I do not know that I would be inclined to say that it is. I think perhaps they are not men of quite the same stamina as the iron and steel workers. As a whole, the iron and steel workers are a superior class of men to the miners.

5501. Then you do not put down fibroid phthisis, or what we may call dust phthisis, you do not put that down as an industrial disease specially incident to either the iron and steel worker or the miner?—It is very rarely discovered; we have had very few cases of it. Amongst some of the very old miners we still get evidences of inhalation of coal dust in their early years, but amongst the middle-aged and the younger miners there is not very much of it. As a class, perhaps I should say that they might be rather more troubled with bronchitis than the iron and steel workers; I am not aware of anything beyond that.

5502. Is there any characteristic industrial disease connected with either of those trades that occurs to you?—Not in the way of disease.

5503. What would there be?—Well, this question of beat hand and beat knee is certainly one that we do come across in connection with the miners, and these ailments are undoubtedly caused by their occupation.

5504. Are beat hand and beat knee the only ailments that you would describe as industrial diseases?—There is, of course, miners' nystagmus.

5505. These are the only ones?—The only ones that come under my observation.

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5506. I suppose you would not call this ailment beat hand unless there was suppuration, would you—formation of matter?—Yes; they sometimes come, fortunately for themselves, before there is any suppuration at all, when the hand is merely in a condition of inflammation, and my experience is that if they stop work and have it treated, at the end of a week the hand is right again; but when they do not come early, once suppuration starts, the condition is exceedingly serious.

5507. Then this inflammation that you describe is more than the sort of inflammation that would be caused by the handling of tools, or by handling cricket bats and things like that?—No, I think that is just the beginning of it, only they continue working too long; if they would stop working as soon as the inflammation sets in, then there is a chance of the condition subsiding; if they do not do that, the inflammatory condition extends, and then we have a very bad cellulitis following.

5508. What is the distinguishing point between what you have termed the inflammation and just the ordinary soreness which a person may get from handling a hammer?—It is merely of degree, it is merely the result of continuing working when they should stop; it sets up cellulitis if they continue working, it extends deeper—that is, at the roots of the fingers and on the palm of the hand they have thickened parts, there is thickened skin, and it is the pressure of the instrument on that that sets up the inflammation underneath it; if they stop work as soon as they feel the hand beginning to pain them a little, inflammation subsides, and if they do not stop work it extends, and we have suppuration up along the sides of the fingers and along the back of the hand, and the condition resulting is very serious indeed.

5509. The only thing that strikes me is this: supposing this beat hand were put in the third schedule to the Act, and a man knew that for a six days' disablement he would get no compensation, and he felt a touch of beat hand coming on, would not he be inclined to stay a day longer at his work and then try for compensation rather than stop at once and get healed and pay for it in his own time?—That depends to a large extent on the individual. I find that the miners and other workmen are very much like humanity generally, you find good and bad; there are some who are very unwilling to take any advantage of their right to compensation at all—they want to get back to their work—and others again would continue to claim compensation as long as the doctor would sign a line for them; but then, of course, I do not look upon this as an accident—it is not an accident.

5510. I suppose it could not be described as an accident?—No, it is the continuous pressure. It is an injury, but not an accident.

5511. According to your view, it seems to us to be rather difficult to draw the dividing line; the injury ought to be sufficiently serious to enable the disease resulting therefrom to be put down in the third schedule?—Yes, it is a very serious condition if it comes to be an actual cellulitis, because men are often off many weeks with a very serious hand; in fact, they run a very great risk of loss of life. I have known of one or two instances where a finger had to be amputated as the result of it ultimately, but that is not a usual thing. I think I only know of two cases within 20 years.

5512. While it is not fair, perhaps, that compensation should be claimed for a mere inflammation, whenever suppuration supervenes a new state of things has occurred which constitutes, as it were, a distinctive stage of the disease; you see what I mean—cellulitis would cover the inflammatory stage as well as the suppurative stage?—That is a continuation. Very frequently they continue working and come to us; they have come to me to begin with after it has really gone beyond the stage of possible cure, when it has extended so as to be a very bad cellulitis.

5513. It might be a question, then, if a man let the injury run on in that way, whether he would get compensation under the Act, whether he has not produced the disease deliberately?—If he were to stop work immediately he felt it painful I have no hesitation in saying that by far the majority, if not all the cases, would recover without any suppuration.

5514. If you took the very widest view of the term inflammation, would that lead to compensation being

claimed for a very large number of cases of small inflammations of a very unimportant character?—No, not such a very big number; it would not lead to so many cases of compensation as men receiving comparatively trivial injuries and continuing to work with them; there are many more cases of blood poisoning and cellulitis following small scratches and slight wounds that the men continue to work with, work perhaps for a week or 10 days, or a fortnight; in fact, I have one on hand just now who worked for three weeks, and is now suffering very badly.

5515. It would be far better they should stop the work and get well before they resumed?—Yes.

5516. And then I suppose you would also perhaps contend that the fact that they were only getting a diminished wage when they were off work would not make them anxious to stay off too long?—I should think it is an almost impossible thing to decide, because one man with a mere scratch would continue working and not be the worse for it, in fact a dozen might do so, and the thirteenth man might suffer—he might have suppuration or something following—and if every man with a slight scratch or a slight bruise were to leave off his work I am afraid the work would not go on very well, because they are continually getting slight bruises and slight scratches, and are able to continue with them.

5517. But these scratches would not be included in your word cellulitis?—Not at the time, but then suppuration is set up afterwards; if they continue working the part gets gradually inflamed, till ultimately they have got to leave off with a very bad cellulitis.

5518. But you would not call a cellulitis got by an injury on the back of the hand a beat hand, would you; there might be a cellulitis from anything?—From a mere prick of the finger.

5519. But you are now getting outside the question of beat hand, are you not?—I am referring to any accident that might occur; very often the accident is merely trivial to begin with, but after working for several days or a week it is converted from being a very slight injury into a very serious one. The men themselves are aware that it is a slight injury; they do not think it is worth while attending to it; the wound has not been properly cleaned, and dirt has got into it possibly. To begin with it is a mere scratch, and then the serious consequences follow; I mean there are more cases of that sort, more serious cases following scratches, than there are serious cases following beat hand. If beat hand and the suppuration following it were made a subject for compensation, there would be fewer claims to pay from that than there would be from serious suppuration following slight injuries.

5520. (*Professor Albutt.*) When this Committee is asked to consider beat hand, do you think that those persons who wished us to schedule beat hand ever intended to include all these other things?—Of course they are included now; compensation has got to be paid in those cases at the present time.

5521. Would it be called beat hand?—It would not be called beat hand; this has nothing to do with beat hand—it is merely answering the question about the frequency with which compensation might be paid; it has nothing to do with beat hand whatever.

5522. (*Dr. Legge.*) Can you define exactly what you mean by beat hand?—These conditions that I am speaking of have nothing to do with beat hand; I was asked about the frequency with which claims for compensation might be put in, and in regard to that what I say is that claims for compensation for beat hand would not be nearly so great as the claims which follow from trivial injuries which are paid now.

5523. (*Chairman.*) Will you give us a scientific medical definition of beat hand, define it as nearly as you can?—It starts as a dermatitis.

5524. Can you give us a proper definition?—It depends on the degree; I don't know that you could define it, except stating it that way from the beginning. It starts with a dermatitis, with a cellulitis following it—a dermatitis, inflammation of the skin, proceeding to cellulitis, with suppurative cellulitis following.

5525. (*Dr. Legge.*) Won't you fix the place where it occurs?—It is on the palm of the hand, of course, just at the roots of the fingers, and it can be at the root of any finger.

5526. Is it connected with the tendon sheaths?—It

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spreads along them ultimately once it goes deep enough.

5527. (*Professor Allbutt.*) Would palmar cellulitis do?—I do not think the line that it takes is the palm of the hand, it is more along the sides of the fingers and along the back of the hand; it is almost, as a rule, at the root of the finger, and sometimes at the back of the hand, but it does not spread so much up the palm of the hand; it is to the back, because there is less resistance at the back.

5528. I think, then, the name palmar cellulitis might be used?—There is less resistance towards the sides and up the back, and that is the reason it extends in that way rather than up the palm of the hand; it is a bad case indeed when there is anything up the palm of the hand; it spreads up the sides of the fingers and the back of the hand, as I say, along the lines of least resistance, but it would be very difficult to define it properly.

5529. (*Chairman.*) Palmar cellulitis, popularly known as beat hand, would that do for you?—If there is practically no cellulitis there, and you have the most of the cellulitis up the sides of the fingers and the back, that could not be called palmar cellulitis. I am afraid I must say I am unable to give an exact name for it.

5530. (*Professor Allbutt.*) How would it do, then, to call it traumatic cellulitis of the hand, and leave out the palm altogether?—Yes, without defining the palm, I think so. There would be less likely to be difficulty afterwards, because if it were called palmar cellulitis, and it was discovered that the cellulitis was in the fingers, I think it would be quite a legitimate objection for one to take that it is not palmar cellulitis—that it is up along the back.

5531. (*Chairman.*) Have you anything to tell us about beat elbow? We have heard something about that. Is it common?—Not very common; miners' elbow is a thing we do not see amongst miners practically at all.

5532. You would hardly call that a characteristic industrial disease?—Oh, no.

5533. Beat knee, would you call that a characteristic industrial disease?—Yes, that is just practically the same as that on the hand; it very often starts, however, as a little furuncle, and then has a cellulitis following that, but that is not so frequent by any means as the condition in the hand, in my experience.

5534. (*Professor Allbutt.*) We were contemplating bursitis, I mean that is what we have been thinking of as beat knee?—In domestic servants you get that more often than in miners.

5535. Mr. Brown frequently used the word pustule, and we could not then quite accept that word. Would he be fairly correct, however, in saying it began in a sort of pustule about the knee, using the word in its broadest sense?—Yes; but I could not swear in any case that that pustule was the result of pressure on the knee; it is merely what I understand is beat knee. What I have come across in workmen who work on their knees has been this: that the condition has started as a little pustule or a little furuncle, and then there has been an abscess following afterwards; that is what I understand is beat knee. With regard to the bursitis, I do not think we have any more of that amongst the miners than we have amongst the general public. My experience is that it is much oftener in females than it is in males—ordinary patellar bursitis. With regard to beat hand, I may remark I find much more amongst the iron and steel workers who are working with tools that they have to grip very firmly than amongst the miners; it is not confined to miners.

5536. (*Chairman.*) There is steel workers' beat hand?

—If you call it miners' beat hand, it is the same thing that occurs in the steel workers, and my experience is that steel workers have it more than miners, only my experience is more amongst steel workers than amongst miners, and probably that is the reason of it; but I have frequently come across it amongst steel workers, men who have to work with tongs or other instruments, and have to grip very firmly, and they get hard pieces along the palm of the hand, and some time or other it inflames beneath; but it is the very same thing that occurs amongst miners, and if it were called miners' beat hand to the exclusion of that in iron and steel workers, it would scarcely be right, I think.

5537. You don't quite see why it should be put down as a disease of miners and not also of steel workers?—No, it is not of miners entirely; it is all workmen who have got to grip tools.

5538. You will have carpenters, I suppose?—Yes, any man who has to work with tools; it is not specially a miners' disease, certainly not. I should say that most emphatically.

5539. On the other hand, the beat knee of the miner is more characteristic of the miner because in other trades you do not have to kneel so much?—That is so.

5540. It is the special position, this crouching down, that makes it rather special to miners?—Yes; but it is a comparatively rare thing.

5541. Can you give us a medical definition of beat knee?—Well, I do not know that you could put it any differently, it starts as a dermatitis with a cellulitis succeeding it.

5542. Have you seen any cases of miners' nystagmus?—Yes, we occasionally come across cases of miners' nystagmus.

5543. Have you come across cases of poisoning with nitrous fumes from explosives?—No.

5544. Have you come across cases of poisoning with carbon monoxide?—Not much now; but perhaps a score of years ago in the steelworks they had an antiquated system of manufacturing gas, and we got that very much.

5545. Were the effects temporary, or did they leave permanent effects?—At that time permanent.

5546. What were the permanent symptoms; you may take it I do not ask the temporary symptoms, because we know them pretty well, but what were the permanent symptoms?—Heart mischief almost invariably; but that is a thing of the past, because the method of gas manufacture in steelworks now is very different, and I cannot say that we come across any cases of poisoning now.

5547. How about bronchitis brought on by different causes? Is that a thing to which miners or steel workers are particularly liable?—Well, miners, I think, possibly are a little more subject to bronchitis than the general public, but not to any very great extent, certainly not to the extent that I would ever think of putting it down as an industrial disease.

5548. (*Dr. Legge.*) With regard to those heart affections produced by inhalation of carbon monoxide, would you describe them just a little more fully?—That is not a thing, I should think, of the present day. I refer to perhaps fifteen or twenty years ago, but I could almost invariably diagnose a man who wrought at the gas in the steel works when he came into the consulting room from the peculiar lividity of his face, his breathlessness, and his pulse being all wrong. There was no doubt that many apparently strong young men who came over from Ireland and attempted to go to that work because the wages were rather greater than at an ordinary iron works were wrecks at the end of several months; that was the condition of matters about that time, but it is a very different matter now. We do not come across that now.

Mr. DONALD MACPHAIL, M.D., called and examined.

Mr. D. MacPhail,
M.D.,

5549. (*Chairman.*) Are you in general practice?—Yes.

5550. Where, please?—Coatbridge, Lanarkshire.

5551. Are you connected with any employers' or workmen's associations? What is the general nature of your relationship with the workmen?—The main part of my practice is in connection with collieries and iron works.

5552. Is that as the medical man belonging to the colliery?—Yes.

5553. How many collieries do you minister to?—One large one and two small ones, and two iron works, for some time there, but one has now ceased working.

5554. I think you are prepared to give us some observations upon various forms of disease?—Yes.

5555. Supposing we first take fibrosis of the lungs—

I will call it grit phthisis, if that definition will suit you?—Miners' asthma is the old name for it in this part of the country.

5556. One would call it grit phthisis to distinguish it from that phthisis which is not caught through grit?—Yes.

5557. I suppose, as a medical man, you would recognise the possibility, given a full knowledge of the circumstances, in the majority of cases of distinguishing between a case of phthisis caught through grit and a case of phthisis of an ordinary character, which might be caught by a man working in grit and yet not be due to the grit?—That would depend altogether upon the stage of the disease at which you saw the man; it would be very difficult to draw a distinction in the early stages; in the later stages there is no difficulty.

5558. But even in the earlier stages, if you knew the whole history of the man, and had a right to ask any question you liked, you might be able to draw a fairly clear distinction?—I have not been able to do so, although that is a point that I have been interested in all my days, because I saw one or two cases when I was a student in hospital—they were rare then, and they are rarer now—and hearing lectures by Professor Gairdner on the subject, and with my mind specially directed to that I have not been able to satisfy myself that there are distinguishing points in the early stages that you could rely upon as guides, what you could call sure signs. The age of the patient might give you some suggestion, the family history might give you an idea; if you knew the character of the workings that the man was in, that too might help you; but from the clinical signs I do not think you could in an early stage, or even until it was considerably advanced, confidently distinguish it.

5559. But still in the more severe cases it becomes easier?—The more advanced it is, the easier it is to distinguish.

5560. I suppose that the disease begins to show itself, you would agree, at about forty years of age, after some twenty years' working at the grinding or the occupation, whatever it may be?—That would depend upon the occupation, I think, a good deal. In some occupations it appears much earlier than in others; I believe in the grinders it appears very much earlier than it does in miners, and I think it appears about as early in breakers as it does in anybody.

5561. The last witness told us that he did not think there was any very special phthisis among miners, not above ordinary occupations through the country. What do you say to that?—I agree. Miners' phthisis of grit phthisis is very rare now, or at least rare.

5562. What about the men engaged in steel and iron works?—There the disease is almost unknown. I have a case on hand just now, a man who is what is called a breaker. The pig iron is broken mechanically. It is lifted out of the bed with a very large quantity of sand adhering to it, and his business is with his breaker, a modified steam hammer, to break it into small pieces, and he stands all day in a cloud of sand. That man has developed the disease very rapidly—in about four years; he has been four years at that particular work, but that is the first case that I have seen in connection with iron works for many many years.

5563. Your view would perhaps rather be that among those occupied generally in iron works phthisis would not be very common, but that there may be special occupations in an iron works which might become dangerous?—That is so.

5564. Regarding the unloading of Spanish iron ore, we have had evidence that that causes phthisis. It is from the secretary of the trade union we had that?—There is a lot of that goes on in our district, but I have had no such experience.

5565. You could not say one way or the other?—No; my attention has not been specially drawn to that by the number of cases turning up, or anything of that sort. For a short time there was a gang of plate-layers working in the works, mostly young men not long over from Ireland, and they went down with phthisis one after another at a most extraordinary rate. I was inclined to attribute that to bad conditions of lodgings more than to their occupation.

5566. And you did not think it was true fibroid phthisis?—No, it was very rapid phthisis, with early hemoptysis, most cases being fatal after a few months.

5567. Now let us take illness set up by nitrous

fumes—that is, from explosives. Have you any experience of that?—I have seen a good many cases, but it is temporary.

5568. It does not leave permanent effects?—I have not seen any permanent effects.

5569. It would be, in fact, treated as an accident, would it not?—I really cannot tell you.

5570. Have you known of compensation being paid for those cases?—They have never been so long ill as to fill the fortnight necessary to entitle them to compensation.

5571. And you have not known of death from that?—No, I have not; there was one particular explosive roburite—that the men refused to work with.

5572. Then poisoning from carbonic oxide. The immediate effects we are pretty well acquainted with; but have you any experience of permanent effects?—None. I have not seen such a case. The temporary effects we are very familiar with. I have been speaking to one or two of the old furnace managers, one a man of thirty years' experience in some of the largest iron works, just yesterday, and he never knew of a case of a man being permanently disabled owing to such fumes.

5573. Now, to take beat hand, can you give us a medical definition of beat hand?—Well, I did not know what beat hand meant until I was listening to you when you were examining Dr. Fotheringham. Beat hand is an inflammation produced by friction, chafing by tool handles, chafing of the skin by tools, I should say, which inflammation may extend deeper and become cellulitis, ending, as any cellulitis may, in suppuration.

5574. Is that common to other professions besides miners—for instance, steel workers?—Yes; but in my experience it has been more frequent among miners than any other men I have had to do with.

5575. Would you treat it rather as a specific miners' disease, then?—As it happens, I have had more experience among miners than Dr. Fotheringham, and he has had more experience amongst steel workers than I have, but it is not infrequent among miners.

5576. The same remark applies to beat knee?—Yes, but there is a distinction to be drawn there. Beat knee is a different thing altogether from bursitis.

5577. It is something like beat hand apparently then?—It is just the fellow of beat hand, superficial inflammation from chafing, and very often from poisoning of a small scratch or wound, men working in dirty water, and it becomes deeper, becomes cellulitis, and may go on to suppuration, and the formation of abscess; it is not so apt to spread as the suppuration of a beat hand is apt to do.

5578. I suppose if the men gave their hands some carbolic dressing, in nine cases out of ten it would stop the whole thing?—It would very likely be well again in a day or two days, with proper bathing and dressing. A great many of the cases are due to want of cleanliness; it is one of the contributing causes of the beat hand.

5579. Do the men take down with them any bottles containing carbolic acid and water, or something of that sort?—No; but they have dressing boxes at the pit head, but that would mean going along a mile or two of workings. They have tincture of myrrh in the stables down below, and they use that, which is not a bad thing.

5580. What would you recommend for men to use for dressing if they cut their hands?—Carbolic oil. It keeps well, and does not lose its strength.

5581. It possibly would be good for the employers to provide some carbolic oil?—Yes, there is always carbolic oil at the pit head.

5582. But it would probably be wise to have a little down below, and a man might smear his hand immediately he got his hand cut?—If they would do it; they are not so careful of themselves as all that. The bursitis is a different thing altogether, and in my experience it has been just as frequent a cause of disablement as the other.

5583. (Professor Albutt.) Are there two kinds of beat knee?—Housemaid's knee is a very common thing among colliers; miners' elbow is a rare thing among colliers, but it sometimes occurs—that is beat elbow; it is a different thing from the beat hand.

5584. And the beat knee may either be a bursitis or it may arise from an external chafing?—Cellulitis.

5585. A poisoned lesion which penetrates?—Yes.

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5586. (Dr. Legge.) What is your objection to the term that we had thought of before, traumatic cellulitis of the hand and traumatic cellulitis over the knee?—Well, beat knee is a local term and beat hand is a local term.

5587. What is your objection to the more scientific description of it as traumatic cellulitis of the hand?—Because that is a stage of it. We have a good many cases painful enough and bad enough to disable men that have not reached the stage of cellulitis. Cellulitis means a certain depth.

5588. I thought your definition was too long, superficial inflammation from chafing of the skin?—You can call it chafing if you like.

5589. You want to describe the inflammation as an "itis" of some sort?—Traumatic dermatitis, in many cases septic, which by extension deeper leads to cellulitis, which may in turn lead to suppuration and formation of abscess, with the usual concomitant constitutional effects.

5590-1. (Chairman.) Will you tell us now about cardiac dilatation. Is that peculiar to miners or to steel workers, or is it a thing that may happen to men in any occupation?—It may happen to men in any occupation. I have never seen a case in a miner; I have seen one or two cases in iron workers, men who filled the ore.

5592. Porters and dock labourers might have the same thing?—Much more likely, I should think.

5593. I think you have got here a list of causes of death in 187 colliers, accidents not included. How were these collected; from what source?—The counterfoils of my death certificates. I happen to have kept them for twenty-five years.

5594. And you have given here in each case the cause of death?—Yes.

5595. Does this list of causes of death present any features that ought to be brought before us, that would be useful to us in our inquiry into diseases peculiar to occupations?—I do not know that it does; it is very interesting to me; but I do not think that it brings out any special feature. There is one feature, the pulmonary diseases account for 82 out of 187 deaths.

5596. That is rather high?—It is pretty high. I really do not know how that will compare with an industrial population similar in social standing in other parts of the country.

5597. Phthisis, for instance, I see comes in here. That will be both tuberculous phthisis and fibroid phthisis?—It is tuberculous phthisis strictly, as far as I could diagnose it.

5598. And how about the fibroid dust phthisis?—That would come under chronic bronchitis, but I do not think I have signed more than five death certificates all my time as being due to fibroid phthisis.

5599. So that out of the 54 cases of chronic bronchitis which you have written down here, we may say that five or six or seven?—Would be undoubted cases of fibroid phthisis.

5600. Then you would have ordinary phthisis, as against that, 14?—Yes. Then there is one case of pulmonary apoplexy mentioned there. I think that was also a case of fibroid phthisis. It was a very interesting case to me—an old man who had begun working at six or seven years, and worked on to within a fortnight of his death at 87. He died 25 years ago, so that he could describe to me conditions which existed below ground 105 years ago. A very intelligent old fellow he was, and he continued working after the fibroid phthisis was very bad for many years.

5601. (Professor Allbutt.) Was all your pneumonia alcoholic?—No; that was merely a note. It means that a considerable number of those cases, if you had to classify them, would have to be classified as alcoholics. I would like to rewrite that—write it out a little more fully, because I have one or two notes there to remind me of things. One point about it is, I have noted the average age at death of the cases as 54 years

of age, which is a fairly good average for working men, I think; but the figure is quite unreliable, because in a very large number of those cases the age is understated for insurance purposes. I have discovered in many cases that the men are really 10, 12, and 15 years older than they are stated to be. This was done for insurance purposes, and the relatives, of course, are very anxious that we should give the insurance figure. The result is that in a great many cases we do not put in any figure at all; we prefer not to put down what we know to be a false figure. There was one famous case in our district where the real age was 96 and the insured age was 64—32 years off, a pretty good deduction to make. I expect that applies all over the country—that the age at death of working men as stated in statistics is absolutely unreliable. You could add five or six, I think, to the figure; I think probably the average age was really 58 or 56.

5602. (Chairman.) We have heard a good many arguments publicly put forward about the early age at which men die in industries, and you think that that ought to be looked upon with some care?—Yes, with grave suspicion.

5603. (Dr. Legge.) Do you think that many of these men here who are said to give up work before they were 40, or at 40, were really 50?—I believe so, some of them—a good many of them.

5604. (Chairman.) Occasionally what is called a prematurely-aged man is sometimes really older than the age given?—Yes, very much; I could not give the figures, but on the back of a good many of these death certificates I have jotted down that point. I found that one man who was supposed to be 54 was insured as being 41; another one, who was supposed to be 82, was insured as 71; and this one that I speak of was supposed to be 96, and was insured as 64. That was the case of a woman, but it shows the principle on which the thing goes. She was shown off as a show case. She was present in Brussels at the time of the Battle of Waterloo—she was a lady's maid to a lady there—and people used to come and see her and reckon up her age, but when it came to filling up her death certificate I was asked to put her age down as 64 to satisfy the insurance people. In my table alcoholism might be more prominent but for the fact that we have to be very careful not to put that into death certificates for the same reason—that the insurance money would very likely be refused, so we have to beat about the bush.

5605. (Professor Allbutt.) Do those societies get no evidence of age?—Those who were born before 1858 might be registered, and might not. I have put down as alcoholic, pneumonia, apoplexy, senile debility, diarrhoea, cirrhosis of the liver, and gastritis. I am sure a large proportion of these cases were really alcoholic deaths, but we dare not say so, because the insurance money would be refused if we did. There are one or two cases in which I have put in D.T., but those were cases in which there was no insurance money in question.

5606. (Chairman.) The last point is trade eczema?—That I have not seen; but I have mentioned the occurrence of boils in the feet and hands of men working in dirty water in the pit. That is a well-recognised thing. That is very much improved lately, owing to improved drainage in the pit.

5607. I suppose that is not different from what is got by grooms in dirty stables?—Identical.

5608. (Professor Allbutt.) In the earlier stages does nystagmus interfere at all with a man's going on with his work?—I do not think it does at any stage. I have only had one case of nystagmus, I think, in my time, but we have a family in our district who have congenital nystagmus. Out of 500 or 550 individuals there are 100 or 200 who have had nystagmus, some of them very marked; they have had it all their lives, and it does not interfere with their work a bit.

5609. In the mines of which you have supervision do they work with naked lights?—Naked entirely; that is the reason why it is so rare, we believe.

Mr. JOHN M. BUCHANAN, M.B., C.M., called and examined.

Mr. J. M.
Buchanan,
M.B., C.M.

5610. (Dr. Legge.) You are the appointed surgeon under the Special Rules for bichromate factories at certain works?—Yes.

5611. How long have you held that appointment?—I have held it for about five years, I think.

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5612. How often do you examine the men there?—Once a month at least.

5613. How many men are there employed, whom you examine?—There will be, on an average, about 35 weekly, or about 140 a month.

5614. And what are they engaged in doing?—Some at the furnace and others in the chrome floor.

5615. In the crystal-house?—Yes—some.

5616. What are the lesions from which these men suffer?—The chief lesions, of course, are the perforations of the septum and chrome holes.

5617. Would you describe the perforation of the septum?—Well, after a few hours in the work some have a distinct milkiness of the mucous membrane of the septum, which increases in the course of next day; on the second day sometimes there is even an ulceration, and it goes from less to more, and then in a fortnight up to six weeks or three months it becomes perforated.

5618. What percentage of the men suffer from this perforation of the septum?—All those in the crystal floor suffer from it; they all suffer from it.

5619. So that, of the 100 workers employed in the chrome department, there will be 90 per cent. with this perforation?—I should say fully that, if not all of them.

5620. Does this perforation of the septum cause serious illness?—No. Some of them complain of a little catarrh, a little cold in the head, and others have no complaint of anything.

5621. Does it lead to abstention from work?—No.

5622. Are there cases where you would like to recommend them to be absent from work for a week or so?—That is to say, as regards the number of chrome holes in their hands?

5623. No, for the perforation of the septum?—No, they never complain of it seriously.

5624. Do you think that, supposing this disease was scheduled, and therefore the workers could obtain compensation for injury done, that they would then be inclined to absent themselves from work, and say they could not work because of the inflamed condition of their nose?—No, I do not think there is more than perhaps maybe 20 or 30 per cent. of them complain of their nose being sore, and that is only for the first fortnight or three weeks; they never seem to complain of it afterwards.

5625. But what I am thinking of is that they might be inclined to feel it more when they felt that if they were absent for a week or a fortnight they would be getting some payment; you do not anticipate that?—No, I do not.

5626. Do you know of anything that would stop this perforation of the septum of the nose?—I tried the insertion of cotton-wool into the nostrils, but it is so difficult to get the men to be interested in their own welfare that they will not continue it. I believe that if it was general, and all the workers used it, then it might succeed, but for one or two to do it they look upon themselves as being more observed than the others.

5627. To what do you attribute the perforation of the nostrils—to dust, or the introduction of the finger?—I think the dust.

5628. And does it proceed more rapidly in one department than in another?—Yes, in the crystal house.

5629. Have you noticed any improvement lately since the introduction of improved exhaust ventilation?—No, I could not say that I have, as no new man has been engaged yet.

5630. It is an exceedingly subtle and rapid process?—Yes.

5631. This perforation of the septum defies all the efforts you have made to prevent it?—Yes.

5632. Then with regard to the ulcers in the skin, would you describe them?—It is due to a little break in the skin which receives the chromic acid, and, unless the worker is careful and clean about his person, the ulceration becomes deeper and deeper until an ulcer is formed in a day or two days, and then if it is allowed to develop, the edges of the ulcer become elevated and eschar is formed in the centre.

5633. Do they heal quickly?—Well, within a week or 10 days we get them to heal.

5634. Is that under treatment?—Yes.

5635. And if they are left to themselves?—They go from bad to worse.

5636. So that they may last for months?—Yes, they 17 may, except they take care of them.

5637. And getting larger and larger all the time?—Yes, or rather deeper and deeper.

5638. Do you know of instances where they have penetrated to the bone?—Yes.

5639. Is that frequent?—Not very frequent; I think I have only had one case of perforation to the bone, and that originated in another works.

5640. Are there many instances in which you have recommended suspension from work?—Yes, there will perhaps be four or five in the year.

5641. Is that to leave the work altogether, or to be transferred to some other department?—To be transferred to some other department.

5642. And during that transference they would not necessarily receive compensation?—I do not know as to that, but they are put in other situations, and I think they get the same wages, or nearly the same wages.

5643. Are there cases where you would have liked to have suspended them altogether from employment and kept them at home?—No, I could not say there has been anyone so very bad as that; of course I have had one which had to remain at home—a new worker who was careless and had been at work about a week.

5644. It was so severe?—Yes.

5645. For how long detained at home?—Two or three months.

5646. In addition to the chrome holes, are there other forms of skin eruptions that they get?—Occasionally those who are very sensitive to it have pustular eruptions on the face, neck, hands and arms.

5647. What is the frequency of them compared with the chrome holes?—There is not more than perhaps 1 per cent.

5648. You have a register of the examinations you make?—Yes.

5649. Do you remember the position of these works before this examination took place; did you treat many of the men in the old days?—Not very many; formerly, about 15 years ago, I used to get them, but I think the engineer of the works got them to go to him, and he treated them, so that they never came outside to medical men.

5650. But at that time, before there was this medical supervision, were these ulcers more extensive and deeper than you find them now?—Well, I did not see very many previous to my appointment, because the engineer treated them all inside the works, and they did not require to come for treatment outside, so for maybe 10 years before that we saw very little of them. Before that, in connection with the societies, I frequently came across them.

5651. Were they severer then?—Well, I think they were a little bigger.

5652. Have you seen results on the eyes from the dust; does it set up inflammation of the eyes?—Yes, it would burn the eye, but not the ordinary dust of the air.

5653. But I mean in the packing department, for instance?—No; I very seldom saw any eye disease except when a drop went into the eye.

5654. Does it affect the ear at all?—No, I cannot say it does, nor the throat either, and I made a careful examination for two or three years, but I could not say I could detect any result in either ear, eye or throat except there was a direct application of the bichromate to the part.

5655. In these works during this last year of 1906 can you say how many have been incapacitated because of the effects of the chrome?—Do you mean put out of the work altogether?

5656. Yes, I mean who would be unable to work and would come under this Act of last session and receive compensation?—I do not think more than three or four altogether would be incapacitated for three or four weeks.

5657. Is there difficulty in getting the men to take the baths?—No, I think the men take them willingly except when they are suffering from heart disease or

Mr. J. M. Buchanan,
M.B., C.M.
17 Jan. 1907. something like that. One or two complained to me, and I exempted them.
5658. It is absolutely necessary for them, when they get this trouble, to have the place covered up while they are at work?—Yes.

5659. You regard this as a special trade disease?—Undoubtedly.

5660. (*Chairman.*) Perforation of the septum of the nose, I suppose, would not incapacitate a man permanently for work?—No.

5661. If a question arose as to compensation, it would be rather difficult to give anything for the perforation of the nose?—They never complain about it; there are even men going back to the work who wrought there

years and years previously. I have asked them if they ever found any inconvenience from the perforation, and they said no.

5662. (*Dr. Legge.*) Does this perforation lead to any deformity?—No.

5663. Does the nose fall in?—No.

5664. Why is that, because other diseases of the nose lead to that?—Well, it does not fall in with them; there is evidently sufficient support. Some part of the septum remains. So far as regards the perforation of the septum, I think it is the rapid impinging of the air against the septum which causes the perforation, causes a collection of dust at the back—at the very bottom—a rapid striking of the septum with the particles in the air.

Mr. DUGALD MITCHELL, M.D., called and examined.

Mr. D. Mitchell, M.D.
5665. (*Dr. Legge.*) You have been appointed surgeon at bichromate works in Falkirk since 12th April, 1900?—Yes.

5666. You have come here to give your experience; will you briefly state that to the Committee?—I was appointed at that date, 12th April, 1900, to examine and treat the cases that occurred at certain works in Falkirk, and since then I have visited the works regularly each month and attended to the patients. The number of individuals I see each month is about 32. Sometimes there are not so many, but they are pretty busy just now, and the number is up to its highest measure. I see 32 or 33 each month.

5667. Of these men how many are affected?—I find there is on an average about 12 affected within the year. Throughout the year we have from 45 to 52 men on the register, according to the trade, and there are from 10 to 12 or 13 requiring treatment.

5668. And what are they requiring treatment for?—Mostly for the hand condition.

5669. Would you describe that?—The chrome ulcer is a sluggish ulceration, usually of the fingers, sometimes of the knuckles, and sometimes at the junction of the nail and the flesh. Its floor is grey, and its edges are swollen, and the whole thing is of a sluggish character. Often we find the edges undermined, and it is rather a difficult matter to get them healed, especially when the men are working, but I think they could be healed a good deal quicker if they were attended to and if they were not at work.

5670. You actually do the dressing yourself?—Well, as a rule I do, but I find a difficulty often in getting them to come and have them dressed; they have got so accustomed to the thing, and they really do not suffer much. My recommendation is that they should simply be transferred to another department of the works in which they do not come across chrome material, and they are usually quite contented with that. I find that they are practically always able to go on with their work under these conditions; I think I have only, during the seven years, had one who had to keep off work altogether, and that was because the ulcer was on his foot, which made it necessary he should rest.

5671. How long was he off work?—For, I think, three weeks; at any rate he was back for inspection next month. He went into hospital. He was a homeless mortal, and he went into hospital for three weeks, and was back for inspection next month.

5672. Is there any other lesion they suffer from?—I mentioned the foot; it is very rare, but I have seen two or three cases at least during the seven years. The eye is occasionally affected. I have never seen it in any other part of the body, except, of course, in the septum of the nose, which is invariable. In my experience they are very seldom a few weeks in the work till the nostrils become affected by ulceration, leading to perforation ultimately.

5673. And after perforation has taken place does the process of ulceration cease?—Yes, when it extends as far as the usual limit.

5674. Does it lead to deformity?—Not the least; it never does.

5675. How do you explain that some part of the cartilage remains?—I think it can only be a matter of nutrition, that the nutrition of this portion of the septum is not so good, the vascularity is not so great as the vascularity of the other mucous membrane of the septum, and whenever the mucous membrane gets

ulcerated through, the septum is deprived of its nourishment.

5676. Are there cases where you think it would have been desirable to suspend the men from employment altogether, say, for a fortnight or three weeks?—Not except where it was in the foot, where locomotion is interfered with, but when it is limited to the hand I have not seen any cases where the men desired to be off, or where I thought that from a humanitarian point of view they should be off.

5677. You mentioned two cases where the eye was affected, in what way?—Mostly conjunctivitis—marked inflammation of the eye.

5678. Did not that incapacitate them from work?—No, they sent them into other employment, and they were quite content to go on.

5679. In the other department of the works they manufacture iodine and bromine?—Iodine, but not bromine.

5680. Has your attention been called to any effects of iodine vapour?—No. I cannot remember having any case to treat, and I decidedly saw none at these works.

5681. Is there much grinding of metal in Camelon?—Yes, a good deal, but I think it is nearly all the wet process, except where the emery is used.

5682. Have you treated cases of fibroid phthisis amongst the workers?—I have one case just now which might possibly be put down to that. He is a grinder in the wet process.

5683. And what is his age?—About 30, I should say. He went back to his work last week. I recommended him to try and get away from the process.

5684. What were the symptoms in his case?—Considerable consolidation without any marked activity; no night sweats, but the cough was troublesome.

5685. Had he been under your observation for long; have you noticed the symptoms coming on gradually?—No, he came under my observation for a condition of the knee joint, and it was during that process that he came to tell me about his cough. I know he had a cough for a considerable time, although not actually treated for it, and I do not think I had examined his chest before that time, which would be about two months ago or so, but he has gone back to his ordinary occupation now. There is decided consolidation, which I should say was of a fibroid character.

5686. Were there any added sounds?—No, except the tubular breathing.

5687. Did you examine to see whether there were any tubercle bacilli?—No.

5688-9. Is that the only case?—The only one I can remember. Of course, they nearly all use water on the stone, but the emery grinding goes on under the same roof; it is used for polishing purposes.

5690. Do you enter the factories at all?—Not at all. I believe no medical man enters them, except when there is an accident.

5691. (*Chairman.*) Are you acquainted with the processes of polishing by materials other than emery?—No. It is really not a prominent feature in our district at all. I was asking another doctor, who, I think, got a communication from you, if he was coming here, and he said "No. I have no experience of fibroid phthisis," and he has been in Falkirk for 15 years.

5692. You could not help us much with regard to phthisis?—No, I do not think there is anything definite I can say on that score.

EIGHTEENTH DAY.

Thursday, 24th January 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).
 Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Professor W. E. DIXON, M.D., called and examined.

5692. (*Chairman*.) You are engaged, I think, in research work in the laboratories at Cambridge, and you are also Professor at King's College?—Yes.

5693. Have you made a special examination of the African boxwood which is alleged to cause poisoning among shuttle-makers?—Yes.

5694. What kind of examination have you made of that wood?—I have not made a chemical examination myself; that has been done by a chemist; but the things he has obtained from the wood and the sawdust itself I have made an examination of, and I have found out what tissues of the body it acts upon and how it acts.

5695. Are you of opinion that this wood contains a poisonous substance?—Undoubtedly; the most important action of it is to paralyse the nerves.

5696. How has that fact been ascertained?—By a considerable number of experiments on animals, all of which get this paralysis. You can experiment on a dead animal. If you take an ordinary nerve muscle preparation and if a small quantity of the active substance obtained from the wood is applied to it the nerve becomes paralysed.

5697. Are you of opinion that the substance in the wood would be likely to have deleterious effects on workmen engaged in the work?—Had I not known of the cases of poisoning I should have been somewhat doubtful, because I found that administering the sawdust to animals had no effect on them at all, but in view of the fact that these cases of poisoning exactly correspond to the action which I have described, there can be no doubt at all, I think, that the poisoning is due to the wood. It is such a very remarkable type of poisoning.

5698. Have you come across similar substances causing similar symptoms in other woods?—No, not in other woods, but the well-known arrow-poison curare has an exactly similar effect almost in detail; in fact, this substance might be curare as far as its action is concerned.

5699. It is not known exactly what it is?—No, because when the actual substance is obtained it is active, but as it is prepared more and more pure it loses its activity, so that it looks as if there were some other substance present which we have not yet grasped.

5700. (*Professor Allbutt*.) Is it your opinion that the effects produced on the workers are consistent with poisoning by this wood?—Absolutely consistent. I think the suggestion that Mr. Harvey Gibson made that it had an action on the heart is completely wrong. The experiments made are quite correct, but the conclusions he derives from them are not valid.

5701. Is it your impression that the poison or the dust from the wood if swallowed is destroyed by the gastric juice in the stomach?—Yes; that is why you can take the sawdust in the mouth and it does not affect one; it is only when the dust is absorbed by the lungs that it is dangerous.

5702. Need it necessarily go as far as the lungs? The larger bronchial tubes might be sufficient?—Possibly.

5703. Would it be sufficient if it collected about the mouth and larynx and nose, and these parts, to be dangerous?—Certainly. My point was that it could

not be absorbed through the skin; that is most improbable.

5704. Then if any kind of adequate protection was given to the mouth and nose, say, by some form of respirator, which did not interfere with the man working, the effects might be prevented?—Yes.

5705. Putting their dusty fingers into their mouths would not be dangerous?—No.

5706. The danger is inhalation?—Yes.

5707. It is a question of the prevention of inhalation of the dust by the mouth and nose?—Yes, certainly.

5708. Have you seen any men who have been suffering from this poisoning?—No; I have only read the accounts of it.

5709. Do you think it likely that the first effects of the poison might be detected by the knee jerks?—Yes.

5710. That is to say, if men showed altered reflexes they are beginning to suffer from the poison?—Yes.

5711. (*Dr. Legge*.) Where did you get the wood from which you made your experiments?—From the Shuttle-makers' Association.

5712. From Mr. Isherwood?—No; he is the representative of the workmen. In consequence of Mr. Harvey Gibson's paper, the masters wanted an independent investigation, and they approached me to carry it out, so that there is no doubt the wood was derived from a genuine source.

5713. Have you read this paper of Professor Harvey Gibson?—Yes.

5714. Do you know his statement that he was supplied with the shuttles, and also with the sawdust, and that the shuttles were of West African boxwood, but the sawdust from which he extracted the alkaloid was South African boxwood?—I had forgotten that.

5715. Do you know exactly what the wood or sawdust sent to you was and where it came from?—It was sent to me as West African boxwood, and it was, as I understand, wood from which the men made the shuttles.

5716. The point is that these experiments of Professor Harvey Gibson were made on the alkaloid he discovered in the South African boxwood, but there is another wood, the West African boxwood, which is closely allied to it, which he thought he was dealing with but was not; and if you were dealing with the West African wood you were not dealing with the same wood, were you?—It was sent to me and labelled, "Knysna boxwood." Then we thought it rather important to repeat Mr. Harvey Gibson's experiments, so we obtained an impure alkaloid in every way similar to that of Mr. Harvey Gibson's, and repeated his experiment which he made on the heart.

5717. Did you get the same action on the heart that he did?—We repeated his experiment exactly. Mr. Gibson is not a medical man, and did not understand what he was getting, as he admits in his paper.

5718. I understand that the chemical part was done by Dr. Titherly, and the experimental part under the supervision of Professor Sherrington?—But those actual experiments are confusing.

5719. Taking the diagrams he gives, did you not get those results?—Yes, exactly; but you see the experi-

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ments were performed on isolated rabbits' hearts, and as a matter of fact, the merest trace of potassium will produce a similar effect; but when the same alkaloid producing those effects is given to intact hearts, it has no effect on the heart at all.

5720. Have you any of this wood still in your possession?—I have some of the sawdust.

5721. In the trade, I understand both South African boxwood and West African boxwood is used indiscriminately, and is known as African boxwood?—Yes.

5722. It would be interesting to know which your sawdust was definitely. Could you ascertain that?—Yes, I think it could be ascertained. I could send you a sample of the wood, and at the same time I could send you some of the sawdust, but I am unable myself to say which it is. I did not know there was that difference.

5723. As far as you know amongst the workers there are no symptoms of paralysis, are there?—No, because if you depress your motor nerve endings, the only ones which would be affected would be the respiratory ones, and the first thing would be a gasping for breath; and that respiratory trouble I put down to the depression of the motor nerve endings. Of course, it is not actual paralysis, and long before you got paralysis the man would be dead from asphyxia; but if you kept him

alive by artificial respiration, and gave a sufficiency of drug, you would get paralysis.

5724. Can you explain the running of the eyes and the running of the nose which is so characteristic of this irritation?—The wood itself and the substance one obtains from it are not irritant. You can drop the alkaloid, and I have dropped it in my own eye in large quantities; and if you rub it in the skin it is not in the slightest degree irritant. It must act after absorption, and I cannot explain it otherwise. It may be due to the irritant particles of the wood which you get with others woods probably as well.

5725. You have described how the breathing is affected. With regard to the symptoms of nausea and sickness, can you say anything?—I have divided the action of the wood into three—one, the effect on the nerve cells. Every drug which affects the brain produces those symptoms.

5726. Do you think if one had looked for it one would have found some increase in the reflex?—Yes, I think so.

5727. Has your attention been called to any symptoms suggesting an effect on the muscular system?—No. There is a tendency first of all to depression of the motor nerve endings, and, secondly, to increase the reflexes; in a sense, they antagonise one another, but in the end you get the weakness or faintness.

Mr. H. BOYLE, called, and examined.

Mr. H.
Boyle.

5728. (Chairman.) Are you president of the Northumberland Miners' Mutual Association?—That is so.

5729. Are you giving evidence on behalf of the Northumberland Miners' Association?—Yes, the Northumberland Miners' Federation, which includes the Northern Miners' Association of between 24,000 and 25,000 members, the Deputies' Association of over 1,000 members, and the Mechanics.

5730. Dealing first with what is known as beat hand. Is that frequent amongst your members?—I have the exact figures here for 1905.

5731. What do those figures show?—They show 55 cases of beat hands for that year.

5732. How long were the men incapacitated?—An average of the 55 cases comes out at 21·89 days.

5733. What was the least period the men were incapacitated?—The least was seven days.

5734. Do you think there were cases of men suffering from beat hand who were away from their work less than seven days who are not included in your returns?—I should think not.

5735. Would an injury which would be classed as beat hand in your opinion incapacitate a man for a week?—At least a week.

5736. Have you yourself had experience of this complaint?—Yes, I had a beat hand, and I was off for seven weeks.

5737. To what do you attribute it?—The friction of the pick on the hand. I had gone from an easy place of work to a hard place of work, and the action of the pick caused it.

5738. It has been stated in evidence that men are particularly liable to beat hand if their hands become soft through not working for a time. Is that so?—Yes.

5739. A suggestion has been made that if men are away from work for a considerable period, perhaps through a trade dispute, when they came back to work many thousands of men might suffer from beat hand. Do you think that is probable?—It is probable; but I should hardly think it possible. I have been in some very long strikes myself, one lasted nine weeks, another one lasted seven weeks, and at the termination of a 17 weeks' strike, when the men recommenced work, to the best of my remembrance, there was one case of a beat hand in a colliery with about 600 hewers. I should say that beat hands are likely to follow after a prolonged strike.

5740. How long do you think it takes for the complaint to declare itself?—In my case as soon as I felt the pain in my hand I could no longer work. If I had been in an easier place I might have kept at work a day or two longer.

5741. How long had you been working in the hard

coal before feeling any pains?—It was less than a week. I could not say the exact time.

5742. Is beat hand a complaint which, in your opinion, arises within quite a brief period of time, and is not due to working in a place for several months or years?—I do not think it would necessarily follow when there had been an idle time for a few days, and the hands had got softened.

5743. (Professor Allbutt.) May I look at your hand? Is there anything to be seen now; has the beat hand disappeared?—Yes.

5744. (Chairman.) How long ago was it you had it?—About 35 years ago.

5745. (Professor Allbutt.) It does not leave a contraction of the hand?—It did not with me. I have seen contractions, but not caused by beat hand.

5746. Do you think beat hand does not generally leave contraction?—I have never seen any.

5747. So that when it is cured it is cured?—It was so with me.

5748. To the best of your knowledge the hand usually recovers completely?—Yes.

5749. Do I understand that a miner who is continually at work, and whose hands are injured, is not very likely to suffer from the disease?—Not very likely.

5750. But when a miner returns to work after an interval of rest he is no doubt aware that if he is not careful he will get beat hand, is he not?—That is so.

5751. How does beat hand begin? What are the sensations?—Heat and pain. The hand gets hot and pains one.

5752. And however anxious a man might be to continue his work, if he is forewarned would not he be wise to give up work at once?—If he gave up work at once, and had it looked after, I think the injury could be readily cured, or the time he was incapacitated would be very much shortened.

5753. May I suggest to you that if he left off work in good time it might not, and probably would not, go on to what you would specifically call beat hand?—Yes, that may be so. I think that accounts for the shortness of time I have given—a week. I think in those cases the men have taken it in time.

5754. The Committee have had evidence that when the malady is truly beat hand, it means a gathering or suppuration in the inner part of the hand. Is that in accordance with your experience?—Yes.

5755. Not a mere tender palm, but when it goes on to suppuration?—Yes.

5756. Short of that, when it is merely superficial inflammation you would not give it quite so grave a name as beat hand, would you? It might lead to it,

but it is not yet beat hand, is it?—That is possible. I think if taken in time it could be stopped.

5757. If, then, it was in some way made easy for a man to give up work, or if his hands were tender, to begin work carefully, would it prevent at any rate a good many of the cases?—Yes, I think so. The doctor can speak better as to that than I can, but that is my opinion.

5758. When it goes on to real beat hand—that is, the suppurating—is that disease specifically confined to coal mining and not found in other industries?—In coal mining, I think, you only find it amongst the hewers. I do not think in any other class of labour in a mine you hear of such a thing. All cases I have known have been amongst the coal hewers.

5759. When you say that beat hand would incapacitate a man for at least a week, it would be a very mild case, would it not? If it goes to suppurating of the deeper tissues it would be a matter of four or five weeks, would it not?—I have particulars of a case which lasted a day short of seven weeks.

5760. And which needed a surgical operation, I suppose?—Yes.

5761. (*Chairman.*) I think beat knee is not a malady frequent among your members, is it?—There are less cases of beat knee in 1905 than of beat hands. I could not get the figures for 1906. There were fifty-two cases of beat knee, and I may say these figures deal with a membership of 37,657 of the Northumberland and Durham Miners' Permanent Relief Fund. Out of that number there were fifty-five cases of beat hand and fifty-two cases of beat knee.

5762. How long were the people affected incapacitated?—On an average twenty-four days.

5763. What are the extreme figures?—The shortest seven days; the longest 176 days.

5764. Are all those cases cases in which the Permanent Relief Fund has paid benefit?—Yes.

5765. You have a rule, have you not, that unless a man is off work for five days, he is not paid?—For six days.

5766. Therefore you would not have under your notice, would you, any cases of men who were incapacitated by either of these maladies for a period of less than six days?—That is so.

5767. What are the symptoms of beat knee?—I never had one myself. The doctor will explain it more fully.

5768. Do you think that beat knee comes on gradually over a series of weeks or a series of months or years?—No, I think it comes on just as suddenly as beat hand.

5769. Have you taken two cases into court under the Workmen's Compensation Act, 1897, one of beat hand, and the other of beat knee, and endeavoured to get compensation?—Yes.

5770. What was the outcome of those two cases?—We lost them. There were several cases of beat hand and beat knee reported to me previous to those two cases, but knowing that they were not provided for in the Act, we informed the people so, and did not proceed with them, but on receiving legal advice that we ought to test the cases, and that it was possible they did come under the Act, we took these two cases into the county courts and lost them. Then we appealed to the High Court, and lost again. We intended to take them to the House of Lords, but we stopped short of that.

5771. What was the ground on which the decision was come to?—That they were not accidents, but were incidental to the work of the miner.

5772. With reference to miners' nystagmus, have you had many cases of that?—Two.

5773. In one year?—No, altogether. I do not think we pay relief in such cases. There was a case some time ago of a man who had an accident to the head at some colliery, and the employers sent their doctor to examine him. The doctor reported that he was not suffering from the accident, but that it was a disease in the eye, which was in no way caused by the accident, and must have existed previously to the accident. We had the man examined by a medical referee, who reported that he was suffering from nystagmus, but that he might have worked for some time longer before being incapacitated, had it not been for the accident to the head which had accelerated the disease.

5774. Apart from that case, have you had other cases under your notice of miners' nystagmus?—Another one has come under my notice since.

5775. Are those the only two cases in your long experience amongst Northumberland miners?—The only two in my experience. Of course, I have heard the thing talked about, but not very much. I believe the Northumberland miners are not much affected by the disease. Whether it is on account of so few safety lamps being used in Northumberland mines or not, I do not know.

5776. (*Professor Allbutt.*) In the two cases you know of, were the men disabled?—Yes, in each case. One is receiving compensation now, but the other has no claim under the Act, though he is idle, and has been ordered not to go down the pit again, and to work at something where he has not to stoop.

5777. In your district nystagmus is apparently a rare affection?—Yes.

5778. (*Dr. Legge.*) Is it generally acknowledged among miners that nystagmus is more frequent where safety lamps are used?—I have heard it put by miners' leaders that where safety lamps are used long, they are sure to cause an affection of the eyes.

5779. Is there any reason why a miner working with a safety lamp should have to strain his eyes more?—Yes, I should think so, because the light is not so good from a safety lamp as it is from the naked light, and to look for minute objects, or even objects that are not minute, at a distance of a few yards, with a safety lamp hanging up, means a tremendous strain on the eyes.

5780. Apart from the two cases you have referred to, have you seen any cases of nystagmus yourself amongst miners?—I could not say.

5781. If you met a miner with nystagmus, could you tell whether he had got it or not by looking at him?—I could not.

5782. (*Chairman.*) Are you of opinion that miners suffer specially from any lung diseases?—I have known a few cases, but I would not like to say that the work in the mines has been the cause of it. I believe miners, with us, at any rate, are probably as clear from lung disease as any body of workmen in the country. I have known men afflicted for a short period when they have been working in a place where the ventilation was bad—not exactly in the lungs, but in the whole system.

5783. Would that incapacitate them for any length of time?—I had a case reported to me some two or three years ago from one of our collieries. The man had been off about six weeks, and the question was put, as he was working in foul air, was he entitled to compensation. I said if the foul air was caused by accident I thought he had a case, but if it was the regular condition of the place, he had no case.

5784. In that case did the man suffer through working for a considerable length of time in a bad atmosphere?—Yes.

5785. Do you think in such cases as those there should be compensation?—I do.

5786. Have you many such cases?—We have not many, and we could not have many, because they would only occur in places where the ventilation had got bad. Cases do occur, but they are special cases, and I have known men suffer and have to be led out of a pit after working part of a shift.

5787. Do they recover speedily?—Yes, they recover.

5788. Would not it be very rare that a man would be obliged to remain away from his work for a week owing to working in a bad atmosphere?—It would be much rarer than in the case of beat hand or beat knee.

5789. Have you had any other cases under your notice of men being incapacitated from other causes?—No; there was another case, but the time he was off I have not got. Those are the only two cases known to me since the Act of 1897 came into operation.

5790. Are there any other injuries to which you wish to draw the attention of the Committee which men employed in mining are liable to?—Yes; there is one other, the sprained wrist, which I suppose would be considered an accident.

5791. Then it is already covered by the Act?—It is already covered by the Act. Coming back to beat hand and beat knee, although I could not give you any figures, there is something which is similar to the

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Boyle.

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Boyle.*
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beat hand and beat knee. The miner in the lower seams in holing the coal sits on a bracket, and they get a beat buttock, but there are very few cases of the kind. They must sit to this work.

5792. Is not that just as much an injury arising from the employment as beat hand or beat knee?—Just the same.

5793. Does it also incapacitate men for over a week?—I could not get any figures, but I learned that although they could not give me a case in Northumberland for the year 1905 there had been cases.

5794. Cases that had been paid for by the Permanent Relief Fund?—Yes.

5795. (*Professor Allbutt.*) I suppose in any occupation stress thrown upon the buttock or elbow or any other part of the body might in certain persons, like as in oarsmen, produce soreness or boils, but it is not more common among miners than other work-people, is it?—I have never known a case myself elsewhere.

5796. We have not been told about this buttock trouble before?—It is the first time I have heard of it myself.

5797. But for an event so occasional it is scarcely worth while, is it, from your point of view even, to bring the elaborate machinery of legislation to bear?—Probably one might think it unnecessary, but supposing you had a man with a beat buttock who was laid up for a few weeks, or for some length of time, as people are with beat knee, what about the man himself?

Mr. JAMES ANDERSON, M.B., C.M., called and examined.

*Mr. J.
Anderson,
M.B., C.M.*

5805. (*Chairman.*) Are you in practice at Seaton Delaval?—Yes.

5806. Do you appear here on behalf of the Northumberland Miners' Federation?—Yes.

5807. With reference to the injury of beat hand, have you had many cases of that under your observation?—Yes, I have.

5808. What are the symptoms?—Pain in the centre of the hand, tenderness, heat and swelling—practically the classical signs of suppuration, sometimes so bad that you get the back of the hand very swollen, caused by the pus following the line of least resistance.

5809. If it is subjected to treatment at any early stage can it easily be cured?—I have seen some cases go back, and I have seen some which, in spite of treatment, have gone forward.

5810. May beat hand incapacitate a man for a considerable number of weeks?—Yes, it may and often does.

5811. Is there any medical expression for this malady other than beat hand?—I have never heard one; it is really an abscess.

5812. Do you think if "beat hand" were scheduled in the Act it would be generally understood in the medical profession?—Yes, I think so; it would certainly be understood by any men who are likely to have any experience of it at all.

5813. (*Professor Allbutt.*) Do you think there are a large number of cases of superficial chafing of the hand, some of which go on to beat hand, or do you think all such cases end in beat hand?—We call them beat hand from the very beginning.

5814. But are you under the impression that a considerable number of them stop short of it. Do the majority come to suppuration?—The majority come to suppuration in my experience.

5815. Do you think as a technical term suppurative cellulitis would be a good name for the complaint?—Yes.

5816. Suppuration is of the essence of the disease, is it?—Yes.

5817. Which makes it clear, does it not, that it does not mean a mere bruise?—No, it does not mean that at all.

5818. As a rule it does not leave any contraction, does it?—No.

5819. (*Chairman.*) Have you ever had experience of a case in which a man has been incapacitated for more than a week by this injury, where the hand has not

5798. But would you go so far as to say that beat buttock was a prevalent thing among miners?—It is not; I have never known a case myself.

5799. Coal dust is not irritating to the lungs, is it?—No, I do not know that it is irritating, but I think any one who has worked in the mines gets it on the lungs.

5800. The Committee have understood from evidence by the miners themselves that miners are rather specially free from pulmonary diseases. Do you think that is so?—I should think they are just as free anyhow as anybody else.

5801. The ordinary conditions of their work are favourable, are they not?—Yes, I think so.

5802. (*Dr. Legge.*) Have you had instances of illness caused by the firing of explosions?—I have heard of two or three cases; in fact, we have had to deal with that, not through the Compensation Act, but we have had complaints from some of our men about the use of some of the higher explosives. They complain that the fumes from the higher explosives, get into their systems and lay them up.

5803. Do you remember what the symptoms they complained of were?—Dizziness, I think, was one.

5804. Do you remember what the higher explosives were by name?—I have heard gelanite, saxonite, and bobbinite complained about. I have not heard so much complaint about gobbinite as to the fumes, but I have heard it complained about with regard to other things.

suppurated?—No, I think not; if it is going to suppurate, it does so before a week.

5820. Have you ever come across a case in which there is no suppuration at all?—Yes.

5821. But it is nevertheless beat hand?—It is nevertheless beat hand.

5822. And it may cause incapacity for more than a week?—Yes. The majority of cases suppurate before the week is out.

5823. If the injury should be included in the third schedule of the Act, and the cases were limited to those in which suppuration occurred, would it, in your opinion, cover all the cases in which compensation ought to be paid?—I think not, because a man is just as incapacitated from working, whether suppuration occurs or not. In my experience, and I think in the experience of all medical men in Northumberland, it only occurs among hewers—only among men using the pick; and a man with a very tender palm is absolutely incapacitated.

5824. (*Dr. Legge.*) Even in cases which do not go on to suppuration, it would be desirable for a man to abstain from work for a fortnight at least, I suppose?—Certainly.

5825. If a man returned to work at the end of a week I suppose there would be risk of restarting the inflammation?—Certainly.

5826. Have you known cases where men have gone back to work believing themselves better, and have suffered from it severely afterwards?—Not in my own experience, but it is possible. My own custom is not to let a man go back to work until I am satisfied the trouble will not recur.

5827. Can you say generally the length of time in the less severe cases that the trouble lasts?—I should think from a week to a fortnight for the small cases. The average length, in my experience, for a beat hand is a month to five weeks—that is before a man is fit to hew again, because if it goes on to suppuration the epidermis peels, and if he goes back before the wound is fairly healed he would have the disease again.

5828. Is the injury a superficial one underneath the skin?—Yes.

5829. (*Professor Allbutt.*) It is, I suppose, a septic poisoning; it must be caused by the introduction of some poison?—Yes.

5830. Do you know if there is any abrasion preceding it?—There is bound to be an abrasion of some sort.

5831. One which you might not see, I suppose?—No, any scratch might do it.

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5832. Would superficial inflammation of the palm of the hand cause it?—You can hardly put it in that way, because you get the pus sometimes at the back of the hand in consequence of the tissues at the back of the hand being loose. The pus follows the line of least resistance, but it starts from the palm.

5833. (*Chairman.*) Can you give the Committee any idea of the length of what one might term the period of incubation of this malady?—No, I cannot tell. One has no knowledge, you see, of when the abrasion occurs; if one had that knowledge one could tell.

5834. I suppose cases would never occur of a man suffering from beat hand when in the employ of one employer, the injury having occurred really some weeks previously while he was in the employment of another?—I do not think so.

5835. With regard to beat knee, can you tell the Committee anything in addition to what has been said by Mr. Boyle?—I think Mr. Boyle put it very fairly. It is a similar condition to beat hand. It is not a housemaid's knee; it is not in the bursa at all; it is in the ligaments lower down than the bursa. It is an abrasion, of course, caused by kneeling. Our Northumberland pitmen kneel on their bare knees, and kneeling on the small coal they are bound to get abrasions, and they get suppuration set up in the same way as in the hand. Our men wear knickerbockers.

5836. Could it be avoided by wearing trousers?—I do not think so; some of the deputies wear knee-caps, which prevents it to an extent.

5837. If all the men wore knee-caps, are the chances that there would be no beat knee?—Yes. This, again, is a disease which only occurs amongst the coal-hewers, I suppose because they are more on their knees than other classes of men in the pit.

5838. Have you ever heard of any case of beat buttock?—No, not until Mr. Boyle told me about it coming up to town. I suppose it is caused by inflammation of the bursa of the buttock.

5839. (*Professor Allbutt.*) Beat knee is not bursitis?—No.

5840. It is the same as beat hand; it is the introduction of a poison through an abrasion of the skin?—Yes.

5841. Is it equally severe?—It is worse; it takes a longer time to cure—certainly six or seven weeks on the average.

5842. Is it your opinion that knee-pads would prevent the disease a great deal—for instance, such pads as a slater wears?—Yes.

(*Mr. Boyle.*) But the coal-hewer is on his knees when he starts getting the coal out, and whatever he wore would be in his way when he began to hew the coal again, while the slater, you see, is always on his knees.

(*Professor Allbutt.*) Do you mean it would interfere with his movements?

(*Mr. Boyle.*) Yes.

(*Professor Allbutt.*) But one sees slaters walking about with these things on.

(*Mr. Boyle.*) Yes; but a slater is not paid by results; he can do what he likes. A coal-hewer is paid by results.

(*Witness.*) There is this difference between slaters and miners, that a slater is kneeling on a perfectly smooth surface, and a miner is kneeling on small pieces of coal. A slater has no risk of abrasion to his knee by kneeling as a miner has, who is kneeling on little bits or coal with sharp edges. The kneeling is the initial cause.

5843. (*Professor Allbutt.*) Of course, barking the skin of any part of the body is apt to cause poisoning, and it is not peculiar to miners, except as it occurs on the knee and hand, is it?—Quite so.

5844. (*Chairman.*) Have you had under your notice any cases of miner's nystagmus?—I have only seen two cases in 16 years, and my predecessor, who has been 40 years in Northumberland, has only seen two cases in his experience; it is very rare among Northumberland miners.

5845. Do you think when it occurs it is due to their employment?—I think so.

5846. How is it caused?—I agree with Mr. Boyle that where it does occur it is caused by the insufficiency of light. You get a better light from a naked lamp than from a safety lamp. The safety lamp is

very little used in Northumberland according to my experience.

5847. Do you agree with Mr. Boyle with reference to the immunity of miners from disease of the lungs?—Yes.

5848. Have you come across any cases of illness caused by foul air?—Not very frequently, but occasionally they do occur.

5849. Are the men incapacitated for more than a week?—I think I have known of a case where the man has been off for a fortnight.

5850. What would be the symptoms?—Intense headache, dizziness, and vomiting very often.

5851. Would it be due to an accident, or would it be a malady contracted by working in bad air for a considerable period?—I think it is caused by a sudden want of fresh air. The air gets slack in a place, and a man is suddenly overcome and has to leave his work straight off.

5852. So that it is really as much an accident as if the man were affected by an explosion?—Yes.

(*Mr. Boyle.*) The cases reported to me were all different from the doctor's experience. Had they occurred as the doctor says I agree it would be accident, and the men would be entitled to compensation under the present Act. If anything occurred to cut the air off, I agree that under the present Act it might be held to be an accident.

5853. (*Chairman.*) (*To the Witness.*) Have you had any such cases in your personal experience?—No, my experience has been the other way, and I have signed certificates for compensation, and the men were actually compensated.

5854. (*Professor Allbutt.*) Were the two cases of nystagmus you have seen very severe cases?—Yes.

5855. The Committee have been told that in a moderate degree the disease is not very important. Do you agree with that?—Yes. It is a lateral movement of the eyeball, but it incapacitates a man if it is considerable.

5856. If it is considerable, is it usually associated with other eye defects?—I should think so, but I am not an expert oculist.

5857. (*Dr. Legge.*) With regard to the symptoms from bad air which suggest rather carbon-monoxide poisoning, do you think that is a likely thing to occur?—I think not. You only get carbon-monoxide poisoning after an explosion. It is carbon dioxide poisoning actually.

5858. Can you tell the amount of carbon dioxide in the air under such circumstances?—No, I have not the slightest idea.

5859. It would require an immense quantity of CO₂ in the air, would it not?—I cannot tell you at all. It is want of oxygen.

5860. That is the excessive presence of nitrogen?—Yes.

5861. Have you seen cases of housemaid's knee in miners?—Yes.

5862. So that there are two kinds of beat knee?—A housemaid's knee is not a "beat knee."

5863. It is a point to be remembered, is it not, in considering what should be included in the schedule, that bursitis may occur?—You have bursitis, and you have the condition of the beat knee, which is not bursitis. Bursitis you get in connection with the Bursa in front of the knee-cap, but you get beat knee further down.

5864. With regard to nystagmus in miners, have you ever noticed the oscillation of the eye?—If a miner has nystagmus you can notice it immediately, but the disease is very rare with us. My predecessor only saw two cases of nystagmus in 40 years, as I have said.

5865. Do you know the description given by Mr. Snell that it is due to the straining of the elevator muscles, and would you like to express an opinion upon that?—No, not being an expert oculist.

5866. (*Professor Allbutt.*) I suppose the strain is much more severe with a bad light?—Yes, it is bound to be. There is another condition that occurs among coal hewers rather frequently, that is an inflammation of the sheath of the tendons, which comes on from the continuous jerking and jarring by the pick in the hewing of hard coal, which incapacitates

Mr. J. Anderson, M.B., C.M.
 24 Jan. 1907. a man from working sometimes ten days or a fortnight.
 5867. What do you call that?—Teno-synovitis.
 5868. Do you consider that more or less specific to the work of the miner?—Yes; I have never seen it except among coal hewers.
 5869. You do not find it among masons?—No, nor amongst the stonemen or deputies in the pits.
 5870. Is it sufficiently common to be characteristic of mining?—I think so.

5871. Have you seen a good many cases?—Yes.

5872. How long do you consider it incapacitates a man?—Ten days or a fortnight on the average. It requires absolute rest.

5873. Can men who have suffered from it go back to work without danger of its return?—Yes. It is shown by a creaking of the muscles when they are moved.

5874. Do I understand that the diagnosis of the disease is quite easy, and that there can be no malingering with regard to it?—Quite so—that is not possible.

Mr. S. COULTHARD called, and examined.

Mr. S. Coulthard.

5875. (*Chairman.*) In general terms may I ask you whether you agree with the evidence of Dr. Anderson

and Mr. Boyle?—Quite so. After my experience of several years I can confirm the evidence of Mr. Boyle.

5876. And you have nothing to add to it?—No.

NINETEENTH DAY.

Friday, 25th January 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).
 Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. T. E. BETTANY (*Acting Secretary*).

Mr. HUGH E. JONES, L.R.C.P., M.R.C.S., called and examined.

Mr. H. E. Jones, L.R.C.P., M.R.C.S.
 25 Jan. 1907. 5877. (*Chairman.*) I understand that you are an eye specialist?—Yes, that is so.
 5878. And that you are Ophthalmic Surgeon to St. Helens Hospital?—That is so.

5879. Have you had under your care a considerable number of glass workers?—Yes.

5880. Among them have you had several who have been suffering from cataract?—I have had seven glass workers suffering from cataract under me.

5881. In what period?—In two years; from the beginning of February, 1905, up to the end of last year, 1906.

5882. Do you think that glass workers, or any particular class of glass workers, are specially liable to cataract?—Comparing the cases I have seen at St. Helens with the cases from Wigan and from Liverpool, the percentage of the total number of cases is rather higher than it is in the other two places. Taking men only, the percentage of cataract to the total number of eye cases seen in the hospital is 1·5 per cent. in St. Helens, 1·12 per cent. in Wigan, and 0·48 per cent. in Liverpool. That is not taking women into consideration.

5883. Do you notice any difference in the incidence of cataract among glass workers compared with the rest of the population with regard to the age at which it appears?—I think not. I have worked out the averages here again, if I may state them. There was one glass bottle finisher in St. Helens whose age when the first eye was operated on was 49, and the second eye at 53. There were six other glass workers operated on during the two years whose average age was 59. If you would like the ages I can give them. The bottle finisher was 49 years of age; then a glass blower was 57; four sheet-glass flatteners were 48, 69, 47, and 67, and one plate maker was 66. Then there were three men who were not glass workers—a blacksmith, 73; a chemical labourer, 55; and another blacksmith, 57. At Wigan the average of the women was 62 years of age, and the average of the men was 56 years. In Liverpool the average for the women was 62 years, and

for the men 58 years. Those are all consecutive cases. So that with regard to age I do not think there is very much difference.

5884. Have you had your attention drawn to the result of the investigations of Dr. Robinson, of Sunderland, into this matter?—I have read his paper.

5885. Do I gather you do not agree with his view that there is a special form of cataract to which workers engaged in bottle finishing are peculiarly liable?—I can hardly say that, because I have only seen one case, and in that case one lens had already been removed and the other one was mature, so that it would not show any characteristic peculiarity as to bottle finishing.

5886. How many years have you been consulting ophthalmic surgeon to St. Helens Hospital?—Only for the last two years. The department was only opened in February, 1905. Before that most of the cases were sent to the Liverpool Eye and Ear Infirmary, with which I am connected.

5887. How many years have you had experience there?—I went there first of all as House Surgeon in 1886, and I have been on the staff in one capacity or another ever since, and that is 20 years.

5888. Has your experience led you to form any conclusion as to whether cataract is a trade disease among bottle finishers?—No; I have never paid any attention to the question until I was asked to give evidence, so that I cannot say I have come to any conclusion whatever. I have simply collected the figures at St. Helens during two years, and compared them with my experience in other places.

5889. Have you noticed any peculiarity in the symptoms of bottle finishers who have suffered from cataract in the cases under your notice at Liverpool?—No, I have not—nothing has attracted my attention at all in that way.

5890. (*Professor Allbutt.*) You say your attention was not drawn to this matter until you were asked to give evidence. That might be a certain advantage, might it not, because you would look into your figures with an open mind?—Yes.

5891. And in doing so you have not found in those figures any important indication of cataract as a trade disease, I gather?—The only thing I would point out in that respect is that the percentage is slightly higher at St. Helens, and that there have been six glass workers affected who are not bottle makers. There was only one bottle maker—a “finisher.” I am told that in St. Helens and the district there are 240 bottle finishers employed.

5892. Is that the kind of work which is alleged to produce cataract?—Yes. All these men, I may say, are subscribers to the St. Helens Hospital, and during the last two years any man suffering from cataract in the district would be admitted to the hospital.

5893. The statistics you have given apply to bottle makers generally, do not they, or have you spoken specially of bottle finishers?—Those 240 are bottle finishers only, but there was only one bottle finisher who came to the hospital with cataract.

5894. Which seems to be certainly not more than the normal incidence of cataract on the general public?—I think not.

5895. The bottle finisher does not suffer then any more than bottle makers in general?—I do not think so. I should say, from my figures, the flatteners suffer rather more than the finishers. Those are the men engaged in sheet-glass making.

ST. HELENS HOSPITAL.

Two Years' Statistics.

| Workers. | | Operation for Cataract. |
|------------------------|-------|-------------------------|
| †Finishers - - - | 240 | 1 |
| *Flatteners- - - | 513 | 4 |
| *Roll Plate- - - | 116 | 1 |
| *Gatherers and Blowers | 1,516 | 1 |

5896. Does the flattening expose them to intense

Mr. WATSON SMITH, called and examined.

5905. (Chairman.) I understand that you wish to give evidence on behalf of the Society of Chemical Industry?—Yes.

5906. Are you yourself engaged in chemical manufacture?—I was at one time; for ten years I was engaged in various branches of chemical manufacture before becoming a lecturer on the subject at Owens College in Manchester, and subsequently at University College, London.

5907. Are you able to give the Committee any information, especially on the question of carbon-bisulphide poisoning?—Yes; that is a subject which appears to me to be most important at the present time. I am not sure whether anything has been done with regard to it quite lately, but I have the evidence of a former friend of mine in Manchester, the late Dr. Ross, who did very valuable work in that direction.

5908. Have you had experience of cases of carbon-bisulphide poisoning?—Yes, in the factory I was engaged in at West Gorton, Manchester, where I was chemist and manager, I had a foreman under me who had formerly been a manufacturer of carbon bisulphide on his own account, but who suffered so much from carbon-bisulphide intoxication that both memory and power of judgment had greatly suffered. He assured me he had never recovered these functions, although he was in better circumstances with me, working in the open air. He formerly worked under cover, and there he suffered very much. As I have mentioned, he lost his memory so frequently that the loss became chronic, and he told me he never expected to recover it as it was originally. It went so far that his loss of judgment made him do foolish things. He set his apparatus on fire and ruined his business, and then had to go out into the world to seek work.

5909. Were there other cases in his works of persons suffering ill-effects from this poisoning?—Yes; there

heat?—I think the glass is very hot at the time it is flattened. It is formed first of all in cylinders, then split and opened out, and it must be very hot in order to admit of the process being carried on.

5897. Have you been in the works yourself?—No, I have not.

5898. Therefore you are not in a position to say whether exposure to intense light, or heat, is greater with flatteners than with bottle finishers, for instance?—I cannot say.

5899. (Dr. Legge.) Do you remember what form of cataract it was in the case of the one bottle finisher you saw?—His cataract was matured when I first saw him.

5900. It was not of the type described by Dr. Robinson?—No, I should say it was more of the ordinary nuclear type. It was so advanced that one could not say definitely whether this particular posterior cortical opacity which is described as characteristic was there or not.

5901. Supposing one were to find that the form of cataract was posterior cortical in the case of bottle finishers, do you think that would justify one in saying it was due to the employment?—I do not think that alone would be sufficient ground.

5902. What is the proportion of posterior cortical cataract to nuclear?—It is generally regarded as evidence of disease in the vitreous body, and not primarily a change in the lens. Posterior cortical does occur frequently where there has been some change in the vitreous.

5903. Mr. Robinson said it was the point where the rays cross, did he not?—Yes, that is so, but I should have thought that that explanation would apply equally to all men who are exposed to intense heat.

5904. Have you had experience of injury to sight from other industrial occupations?—No, not specially. As I say, until I was asked to give evidence on this point I had not specially directed my attention to the matter, and it has not been sufficiently noticeable to make one think of it, nor do the figures show any special earliness of incidence.

was a person he told me of who knew a number of cases of men who had become so ill from frequent intoxication by the vapours that they became unfit for work, their memory and judgment were impaired and they became reduced more or less to imbecility.

5910. Do you think there is no doubt that was due to the use of carbon-bisulphide?—Yes; I have not the least doubt of it; Dr. Ross's experiments are most valuable, and they testify to that. He diagnosed the cases of some men who were disabled in some of the Manchester water-proofing and india-rubber establishments, and he has gone into detail in a thoroughly scientific manner.

5911. Can you give a reference to his publications?—I should be very glad to do so. I can hand you a copy of the “Medical Chronicle” of January and February, 1887, in which Dr. Ross's articles appeared.

5912. The poisoning arises gradually, I presume?—Yes. I do not know whether I should occupy your time too much by reading Dr. Ross's statement. One of the varied symptoms is called double ankle drop; a man becomes lame, the injury beginning at the toe. That is only one of the many peculiar symptoms of the affection. The principal thing is that the affected persons gradually become imbeciles through frequent bisulphide intoxication, and some of them, as Dr. Ross shows, have been confined in lunatic asylums as lunatics, and some were not permitted to come out. The condition then, of course, they leave their families in, must be a very serious one.

5913. What should you say was the minimum time within which a worker must be employed in this industry in order to develop marked symptoms of the poisoning?—In one case which Dr. Ross mentions a man, after working for a few weeks, began to suffer. In the case of another individual, he worked for three

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M.R.C.S.

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† The whole district of St. Helens.

* These figures relate to one large firm only, but happen to include all the cataracts in those classes of workers.

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months before feeling the ill-effects from the gas, and then the symptoms commenced.

5914. Have you experience of any recent cases?—No, no more recent than 1893; but I heard that things were going on pretty much as before in 1897, from an old student of mine at Owens College. I have quoted his statement in the lecture I delivered in University College. His name is Mr. H. L. Terry.

5915. Is that recent?—It was in 1893, showing that from 1887 to 1893 there had not been very much done. He says:—"There is in some quarters an impression that whiskey prevents and staves off these ill-effects, and Mr. Terry believes that whiskey is allowed in some establishments, though not by his firm. He adds that there were certain small factories confining themselves to the making of waterproofed garments, and it was in the small ill-ventilated shops of such factories that mischief was especially done."

5916. Can you give the Committee any information with regard to naphtha poisoning in indiarubber works?—I think naphtha does not poison to the same extent. At the place I was connected with they went in for the manufacture of naphtha from coal tar. Crude benzol contains bisulphide of carbon to the extent sometimes of 6 per cent., and if a man were exposed to the vapours he would certainly become injured, but almost all tar stills are worked in the open air, and thus the men escape any ill-effects. In curing rooms in india-rubber factories the rooms are covered in, and sometimes women are employed as well as men. Dr. Oliver shows clearly that abortions and miscarriages, and all kinds of ailments are caused in the case of the employment of women in these places, besides other injuries to both men and women in connection with the generative organs and sexual functions. Dr. Ross goes into detail as to all this, and I have an extract from a letter of Dr. Oliver, published in the "Chemist and Druggist," on the point. He says that bisulphide of carbon is worse than lead-poisoning even, his words being: "Still more decided, even, is the deleterious influence of bisulphide of carbon on the organs of generation, for not only does intoxication by this compound predispose to abortion, but it tends to abolish the sexual desire, and induce a state of impotence."

5917. (*Professor Albutt.*) What date is that letter?—1893.

5918. Your evidence is of the greatest gravity, and, supported by so high an authority as Dr. Ross, commands the highest respect. It is very grave evidence, is it not?—Very grave indeed, and for that reason I did not care to speak of anything else. I have lectured before the Sanitary Institute in connection with other branches of chemical manufacture, on the sanitary question, but I felt this matter to be so much more important than any of the other subjects that I thought it best to confine myself to it.

5919. Do I understand your evidence under both heads to be evidence as to bisulphide of carbon?—Yes.

5920. That is the active poison?—Yes. I have a friend in Manchester, who was formerly the Mayor of Salford, Mr. I. Frankenburg, who is the only manufacturer I have known who has taken so large and wise an interest in the welfare of his workpeople, that as far back as 1885 he took out patents for a method and arrangement of plant for overcoming this difficulty.

5921. Are you speaking up to date now?—Yes. I think his first patent was in 1885, and he has taken out two or three patents since. A party of our Society of Chemical Industry was taken round Mr. Frankenburg's works in 1897, so that we could see the whole operation, and although we went actually into the curing room, the members were not inconvenienced at all by the odours.

5922. You said that the severe cases probably came from the small and ill-ventilated shops, did you not?—Yes.

5923. Are you speaking from personal knowledge and up to the present time?—Yes, up to about 1897.

5924. Up to date?—Yes, up to that date.

5925. Do you think the conditions of the manufacturing have been so altered during the last 25 years that the gravity of such reports as Dr. Ross's must now be interpreted in the light of modern experience?—I think things are going on not quite so badly perhaps, but pretty much in the same way.

5926. Have you any idea how many operatives are

engaged in this employment?—A very large number—male and female.

5927. Are there any degrees of individual immunity and susceptibility among the men, or do you think they all suffer alike?—According to Dr. Ross's evidence, I should think some are more susceptible than others.

5928. Do you know what percentage of the work-people suffer in this way?—I should say the whole of them if they were exposed would eventually succumb.

5929. Even in fairly well ventilated shops?—The great difficulty is bringing about perfect ventilation. My own belief is, and Dr. Ross's statement is, that nothing will be done thoroughly until these places are put under strict supervision.

5930. How far do you think the alleged deterioration of judgment incapacitates the workman from performing his ordinary duties as an artisan?—It absolutely prevents them; they become practically lunatics, and one man, according to Ross, ran into a shop and hid himself under a carpenter's bench amongst the shavings.

5931. So that it would make him unfit for his occupation, would it?—Yes.

5932. Is it found as a matter of fact that the work-people have to be continually removed and others taken on in their places?—Yes.

5933. Is the average age at which men leave the employment very early?—I have no data as to the age.

5934. You cannot say how long on an average a workman finds himself able to continue at this occupation?—There are various branches of it, in some of which they are not exposed; but where they are exposed I do not think it would be possible for any human being to inhale these vapours and undergo this intoxication long. It is an intoxication so much like the alcoholic that it is almost impossible to discriminate, and I have heard of men accused of being intoxicated when they have had no drink at all.

5935. Are the foremen of the shops exposed to the fumes?—I expect they look after themselves more than the actual workmen can. The late Dr. C. Otto Weber had a mode of discriminating between alcoholic intoxication and that by bisulphide of carbon by administering soda-water and milk, the restorative effect being great in the latter case, but nil in the former.

5936. Might I suggest this difference, that whereas those who have been exposed to bisulphide of carbon become more or less permanently injured, those suffering from alcohol probably recover?—Yes, the intoxicating action wears off, but a further insidious effect is set up and progresses in the case of repeated bisulphide intoxication.

5937. How long an average daily exposure do you think would be required to cause injury. The workmen are subject to it the whole working day, I suppose?—Yes.

5938. Would foremen and persons going in and out of the shops, or even the proprietors and managers themselves be in any danger?—No, I do not think they would; going into the open air would restore the normal functions.

5939. Repeated short exposure would not have the same ill-effect, you think?—No, I do not think it would, provided the exposure were to fumes sufficiently diluted with air.

5940. Is it one of your points that the bisulphide of carbon either so attaches itself chemically to the nervous tissues or inflicts so serious an injury upon them that no amount of subsequent fresh air, or change, or rest, will get rid of the disease?—If sufficiently great exposure to the vapours take place, certain cases, Ross shows, have become hopelessly chronic, others of less exposure are less chronic. I have record of a case in which a man had to be three or four months in hospital and then afterwards went into some asylum.

5941. The industry is a very large one, is it not?—Yes, it is.

5942. Where are the chief seats of the manufacture?—I think the largest are about Manchester. There are a few in the East-End of London. In going round Mr. Frankenburg's factory and with his arrangements, no inconvenience was felt.

5943. Do you think the medical men in the district

would be able to produce to us workpeople injured by this process?—I have little doubt of it.

5944. Do you think they would be able to produce 10 or a dozen of them?—Probably so. A great friend of the late Dr. Ross was Dr. Julius Dreschfeld, of Manchester, who would be able to give you valuable information.

5945. (*Chairman.*) Have you yourself had any first-hand knowledge of any cases in recent years?—Only the case of the man I mentioned who was a foreman, and in 1870.

5946-7. How long ago was that?—1867, 1868, and up to 1870.

5948. (*Dr. Legge.*) Is the vapour of carbon bisulphide a heavy vapour—heavier than air, do you know?—In the factory mixed with air and air currents, warm and cooler, it would not sink or stagnate, but intermix. If it were able to accumulate and stagnate it would sink just as carbon dioxide does.

5949. But if carbon bisulphide was confined in a chamber by itself and the fumes were taken away by a fan, do you think that would protect the workers?—Yes. Mr. Frankenburg had proposed to do that, and then to scrub the vapours as they passed through a condensing tower, finally recovering the bisulphide.

5950. If the workers were all examined by a doctor every month with power to suspend those from work who showed the slightest symptom, and, further, if they were only allowed to work for two and a half hours at a time even with the vapour confined and removed in that way, do you think there would be much risk of danger then to the workers?—No, I think it would be most valuable to have supervision of that kind, all other things being equal, because at the first appearance of symptoms they would be allowed an opportunity of recovering before anything of a chronic nature set in.

5951. Are you not aware that that has been required under special rules since 1898?—I was not aware of that.

5952. Would you be surprised then to know that we had not heard of cases of serious poisoning arising in these works since then from the doctors who examined

the workers?—I should be much surprised, unless changes had been made in the modes of working. But even then, and because of difficulties to be anticipated for the doctors in securing all cases of suffering, through motives of fear, reticence, anticipated loss of work, or reduction of usefulness and so of wages, or loss of ditto, etc., etc., I would suggest the testing the atmosphere of "curing" and other working-rooms from time to time. Such inspection would be strongly merited in the case of so insidious a vapour as that of carbon bisulphide. In all probability the inspections in such case would forestall and greatly reduce the chances of symptoms, and thus necessity of medical aid.

5953. Do you know whether the process by means of carbon bisulphide is going out, and other methods are being adopted for vulcanising?—Mr. Terry mentions that a substance was coming in in 1893 for that purpose—namely, carbon tetrachloride; but I never heard of its being much used, because the indiarubber is not so soluble in it as in the carbon bisulphide, and for other reasons.

5954. Do you see any reason why other substances should not be found which would produce equally well the vulcanising effect?—No, and I should not be surprised to know that among the numerous chemical discoveries made from time to time some substance would yet be discovered, but I do not think it has been so far.

5955. Have you had experience of chloride of sulphur?—Yes, I have; it is used mixed with bisulphide in the vulcanising process.

5956. Has chloride of sulphur itself any injurious property?—No, except that it would be irritating to the lungs, the very irritation preventing insidious action.

5957. It does not produce the same symptoms as carbon bisulphide?—No.

5958. Do you know of other industries, besides the curing of india-rubber, in which carbon bisulphide is used?—Yes, the extraction of oils from seeds; in fact, any cases in which oils have to be extracted on a large scale from seeds, or cotton waste or similar material.

5959. What would those works be called?—I think oil-extracting works, or oil works.

Mr. ALEXANDER JAMES KNIGHT, called and examined.

5960. (*Chairman.*) Can you give the Committee some evidence on the question of the effects of their employment on dining-car attendants on railways?—Yes.

5961. Do you represent any organisation?—I belong to the Amalgamated Society of Railway Servants.

5962. Are the dining car attendants, or some of them, included in that organisation?—Yes.

5963. What maladies do you think this class of workers specially suffer from?—Consumption brought on by chills, and they suffer also from rheumatic fever.

5964. Owing to changes of temperature?—Yes. It is our duty, when stopping at stations, to assist passengers out of the cars, and also to instruct passengers on the platforms.

5965. I suppose there are no statistics available showing to what extent dining-car attendants suffer from these diseases as compared with the rest of the population?—One or two have had very bad illnesses.

5966. But you have no general statistics showing that consumption is more prevalent among these men than amongst the rest of the population, have you?—No.

5967. Do I understand that you are of opinion that dining-car attendants ought to receive compensation if the diseases were due to their employment?—Yes.

5968. Can you suggest to the Committee in what way it can be determined whether a dining-car attendant who suffers, say, from rheumatic fever, has contracted that rheumatic fever from his employment or in some other way? There is no difference between the rheumatic fever from which they suffer and the rheumatic fever from which other people suffer, is there?—No.

5969. How would it be possible to say that it was contracted from their employment?—Only by their being healthy when they come into the service, and catching a chill. Also night travelling between two

days' work, where men are fatigued and sleep on floors of cars and are subject to draughts.

5970. Similarly, with regard to consumption, do you think it would be possible to prove in any individual case that the consumption was originally contracted through the employment?—Of course, that disease runs through a family generally, but sometimes you can tell by the vibration of the trains, etc., the nerves are upset. Also heats and colds alternately combined with dust.

5971. Are there any other diseases, do you think, which this class of people suffer from in consequence of their employment?—Yes; bad veins through standing so long, and the constant vibration affects them.

5972. Do you think the vibration of the trains causes that?—Yes.

5973. Do they suffer more in that way than, say, engine drivers or stokers?—Yes, I should think so, because they have to run up and down the cars in the performance of their duties.

5974. Out of 20 dining-car attendants would you expect to find some, and, if so, how many, suffering from bad legs?—I should say about one in 40.

5975. Should you say that is a larger proportion than among waiters in hotels?—Yes, I should think so.

5976. Do you think that dining-car attendants suffer from nerve disorders of any kind?—Yes.

5977. Have you had any special cases of that come to your own knowledge?—Yes; there is a late inspector of dining-cars who has retired in consequence.

5978. What did he suffer from? Was it any form of nervous breakdown?—Yes; chronic catarrh or some such disease.

5979. Do you think it was due to his employment?—Yes.

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5980. Are you acquainted with a large number of dining-car attendants?—Yes, on the Great Western Railway.

5981. Do you know a great proportion of the men so engaged on the Great Western Railway?—Yes.

5982. How many men have you known who have suffered from nervous breakdown owing to their employment, and who have had to give up work for a long or short time?—Three or four.

5983. Can you afterwards furnish the Committee with the names of the men for their private information?—I am afraid I could not. I have come on behalf of Mr. Moore, you see.

5984. Could Mr. Moore furnish us with any such statistics, do you think?—Yes.

5985. (*Professor Allbutt.*) What number of men do you represent?—I only represent Mr. Moore. I attend on his behalf, as he could not come.

5986. About what ages do men enter and leave the employment in dining-cars?—From 15 upwards.

5987. Then they come in young, do they?—Yes.

5988. In inferior positions, I suppose?—Yes.

5989. Is it an employment which attracts men to stay for many years, or do they go to other things?—They stop several years. Of course, they change from one line to another.

5990. I suppose they can quite easily take up waiting at hotels again, and are able to move about, that is, from one employment to another?—Yes.

5991. Do you think that, as a rule, they stay in dining-cars for only a few years, or do you think they stick to the dining-cars?—They stick to it fairly well.

5992. That does not suggest that they find it interfere very much with their health, does it, seeing that it is not difficult for a dining-car attendant to change that particular mode of employment. He could easily go to an hotel, could he not?—Yes.

5993. You do not allege, do you, that there is any particular difference in the experience of a dining-car attendant to that of a stoker or guard or engine driver with regard to vibration?—There is a little more vibration.

5994. Have you ever ridden on the footplate of a locomotive?—Yes. This occupation differs from guards and drivers, inasmuch as the men are not only required

to be in and work the train, but are on a continual move all the time.

5995. Would you say there was more vibration in a dining-room car than there is on a footplate?—I do not think there is so very much difference.

5996. What do you mean by a bad leg?—Veins.

5997. Do you mean varicose veins?—Yes, caused by so much standing.

5998. I dare say you know that that is very largely a hereditary thing, do you not, and goes from father to son?—Yes.

5999. And a tendency to that would no doubt be favoured by any occupation keeping men on their feet?—Yes.

6000. Do you suggest that there is anything in the movement of a car, otherwise than having to stand up and walk about, to produce a bad leg?—No.

6001. There is nothing beyond the upright position, is there?—Nothing, and being on the springs.

6002. Should not you say that in a dining-car there is much more oscillation than vibration? It is more like being in a ship at sea, is it not?—Yes.

6003. It is not exactly the vibration then, but that you are thrown about from side to side. A waiter's duty on a car would not differ, would it, from that of a waiter on board ship; in fact, it would not be so bad?—Perhaps not; but there is the sudden stopping of the train, and all that kind of thing, which might throw one about, and one might bruise a leg or an arm.

6004. The dining-car attendant is occupied, of course, in walking and standing about a good deal during the time of serving meals, but during a considerable part of the day he is sitting down, is he not?—Yes, when he has finished.

6005. Would you say that he is standing and moving about for half his time or more?—For three-parts of his time I should think.

6006. With regard to the rheumatic fever and consumption cases, you are not prepared to say, are you, that they are more frequent among your class than among other classes of people? There is nothing in the conditions of working on a train which would make a man more liable to consumption than if he was engaged in any other occupation, is there?—Of course, there is the constant tramping up and down in the cars, which causes a certain amount of dust.

Mr. P. J. O'KEEFFE, L.R.C.P., L.R.C.S., called and examined.

Mr. P. J.
O'Keeffe,
L.R.C.P.,
L.R.C.S.

6007. (*Chairman.*) Are you a medical man, in practice at St. Helens?—Yes.

6008. Are you medical officer to any of the trade unions?—No. I am medical officer to some societies—the Chemical Society and Miners' Society.

6009. Have you had a great deal of experience of ailments from which glass-workers suffer?—Yes, bottle-blowers chiefly.

6010. Do you think there is any illness which they contract owing to their employment?—Bottle blowers, yes. Emphysema of the lungs they suffer a good deal from.

6011. Do you think they suffer more from that than other glass workers do?—I think they do.

6012. Have you any statistics which you can put in with regard to it?—No.

6013. Are the symptoms which they present different in any way from the symptoms of emphysema amongst other persons?—No.

6014. So that taking any individual case it would be very difficult to say whether the illness arose from the employment or not, would it?—It would be difficult to say.

6015. Do you think it would be possible to say?—My experience is that a great number more glass blowers suffer from it than men in other employments and if I found emphysema in a young man who was a bottle-blower without any cause for bringing it on otherwise, I should be inclined to think it was due to the nature of his employment.

6016. But would a court of law be entitled to hold

that it was?—My opinion would be that it would be due to his employment, that is provided other causes were absent, and there was no reason to suspect that it was brought on by any other cause.

6017. Is this disease, in your opinion, due to working at this employment for a considerable period, or might it arise after a man has been at work as a bottle-blower for a very short time?—It would gradually arise; it does not come on suddenly, it progresses, and I should say that after a man had been in the employment of bottle-blowing for perhaps a year or two, or perhaps less, the disease would begin.

6018. There is a preliminary period in which a man becomes more and more susceptible to the disease, is there?—The lung gradually becomes weakened by the nature of the employment, but evidence of the disease would not manifest itself perhaps before a year or two.

6019. Why does this special employment injure the lung?—Because the exit of the air from the lungs is interfered with. The man wants to blow; he draws a deep breath, and fixes his chest. Then he has to blow through a tube into a bottle, and there is an obstruction to that effort, and the lungs have to be held in the effort to blow; the result is that the air cells are gradually enlarged and the spaces between them are gradually made thinner and become atrophied, and the air cells run into one another practically eventually.

6020. Are these cases frequently serious cases, or do they speedily yield to treatment?—They do not speedily yield to treatment, but a man can go on working with this disease for a great number of years.

6021. Suppose the disease were scheduled as being a subject of compensation under the Workmen's Compensation Act, how would it be known in what employment the disease was contracted, when perhaps it might have been contracted many years previously, and the man had gone from one employment to another?—It would be impossible.

6022. It is a disease of very gradual growth, and might continue, might it not, for a long time before incapacitating a man from working?—That is so.

6023. In fact, it may continue for many years before a man is incapacitated, I suppose?—Yes.

6024. Can you give the Committee any information with regard to cataract among bottle finishers?—I have not much experience of that, for the reason that in St. Helen's, for each bottle works there is a doctor appointed, who has charge of the cases coming from those works. They seldom get into the hands of other practitioners outside the club doctors. My experience of cataract is this: I have not met cataract much in people of under 45 or 50 years of age. As a rule, it is from that age that they get cataract, but if I had a case of hard cataract in a man under 45 years of age who was a bottle finisher or who was even a gatherer or a founder, I should say that the disease in that man was due to the nature of his employment. Authorities differ about the matter. Dr. Robinson, who is supposed to be an authority, asserts that it is very prevalent among bottle finishers. The cases he cites are nearly all old cases; he only cites one case at about 40 years of age, all the others are 60. Dr. Snell holds a different opinion, and he is also a distinguished authority, so that it is really difficult to say whether cataract in a man of 50 years is due to natural causes or to the nature of his employment. At 40 years of age as regards hard cataract in a man employed in a glass works, I should say it was due to his employment.

6025. Have you observed any peculiar symptoms in any cases which have come under your notice?—No. I have not seen it under 55.

6026. But even amongst the older men have you?—No.

6027. Can you give the Committee any evidence with regard to miners' fibrosis of the lung?—Yes, that is a disease of which I have had considerable experience, and I have been treating cases for 12 years, though at present I have only one case in my hands. I have found, and my diagnosis has been confirmed by a post-mortem examination, that it progresses very slowly and frequently attacks the apex of one lung only. It can be easily diagnosed by a medical man. The lung shrinks, the chest wall falls in, and the man has a bad cough—a very hard and troublesome cough with purulent expectoration. Then other troubles come on with regard to the lung, and in some four or five or six years you get an enlargement or dilatation of the right ventricle of the heart. The kidneys frequently suffer as the result of this heart trouble, and the blood vessels get diseased, and frequently in post-mortems where it is discovered that a man has died of apoplexy you have all those conditions traceable, in my opinion, to fibroid phthisis, which is pretty prevalent amongst colliers. I have seen it in colliers much.

6028. Have you any experience of ganister miners, or have you medically attended them?—No.

6029. So that you are speaking now, are you, of coal miners?—Yes.

6030. Do you think that coal dust is an irritant to the lung?—It is undoubtedly, in my opinion.

6031. And tends to set up fibrosis?—Yes.

6032. Suppose you saw a man suffering from these symptoms you have described, without knowing the history of the case, would you be able to say with any degree of certainty that that man was a miner and was suffering from miners' phthisis? Suppose you saw a man in hospital, without knowing what his employment had been, could you tell merely from the symptoms he showed that those symptoms were necessarily due to his employment in a mine?—No, I could not. I should at once ask if he was a collier.

6033. And if you found he was a collier you would be of opinion, would you, that the probabilities were that his disease was due to his employment?—Yes.

6034 (*Professor Allbutt.*) Are you referring to colliers in your own district?—Yes.

6035. Are the miners engaged in excavating rock as well as coal in your district?—No, I do not think so.

6036. In most collieries they have to excavate a certain amount of rock in addition to the coal, you know?—They have what they call night men to remove all the useless stuff in my district.

6037. Still the men would be colliers, would they not?—No, they are not colliers; they do not get coal; they are not men who work the coal.

6038. But they are miners, I suppose?—They are simply employed to remove the waste material from the mines.

6039. There is a very great amount of evidence to suggest, if not to prove, that coal dust is not injurious, but that coal miners who have to excavate in rock and inhale silicious dust in addition to coal dust, may suffer. Do you take any objection to that possible explanation?—No.

6040. You think it may be so, do you?—Yes.

6041. Do you find fibrosis cases are frequent?—They are pretty frequent among colliers.

6042. Have you any other dusty employment in your district beside coal mining?—There would be some dust at the glassworks, and in the chlorate of potash works there would be some dust.

6043. You have no grinders or persons who would be exposed to iron dust, have you?—No. Of course, we have iron foundries, but that is a different thing.

6044. You have seen *post-mortem* examinations, have you, in these cases?—Yes, I have seen a great number of *post-mortems*, and a good many cases of miners' phthisis.

6045. Generally, you have seen a large number of *post-mortems*, have you?—Yes.

6046. So that you have been able, of course, to verify your clinical observations?—Yes.

6047. Do you find that the cases are often uni-lateral?—Yes.

6048. More often than not?—Yes. I notice more cases of one lung affected than both.

6049. Have you had experience in examining for other ailments the chests of a good many persons subject to the conditions which cause fibrosis, so as to ascertain the incipient stage of the disease?—Yes, for insurance.

6050-1. Can you tell us then what you conceive to be the initial physical signs, as early as you can carry your mind fairly confidently back towards the commencement of a case?—A cough, a dry morning cough especially, is about the earliest symptom, and you have no sweating and no constitutional disturbance.

6052. Can you say whether the temperatures are high or not?—They are not; they have no constitutional disturbance. Then sometimes there is purulent expectoration, and on examination of the sputum you do not find tubercle bacilli.

6053. We have been told that dyspnoea is an early symptom, is that your experience?—No, it is not an early symptom.

6054. When there is a good deal of lung injured the men get short of breath, do they not?—Yes, but until then they work and continue at work. The last case I had was a man of about 60, who worked up to within a few weeks of his death.

6055. What would you consider to be the early stages of the physical signs?—I have not had many cases—I think, only about one that I could really call early, and the disease was even then pretty far advanced. I really cannot say that I have had any experience of the very early stages. The men do not come to me early, because they have no constitutional disturbance, and they continue to work.

6056. The nutrition keeps fairly good?—Yes. Of course, when the lung begins to shrink, and the chest wall falls in a little bit, you have the infected portion of the lung, and also the good portion, becoming more or less emphysematous.

6057-8. Do you examine many of these men for insurance?—Yes, a great number.

6059. Can you tell the Committee what you find among most of them?—You get heart trouble very frequently.

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6060. I mean so far as is caused by the dust?—You have nothing in the young people, and the old people are not very often insured because of their age.

6061. Taking a man who has been engaged in the work for ten years, what would you expect to find the condition of his lungs?—They might be all right, but in the majority of cases you would have bronchitis and emphysema.

6062. Do you agree that the physical signs are very much less than would be expected from the amount of cough?—Yes, that is so.

6063. So that if you found a person whose nutrition was fairly good, but who had a chronic cough of the kind you have described, and who might also be rather short of breath, and in whose chest there were physical signs, too, but of an indefinite and general kind, do you think that that would enable you to diagnose the case as one of fibrosis?—Yes, it would.

6064. As opposed to ordinary tuberculous consumption?—Yes.

6065. What part do you think tuberculosis plays in these cases—an important part or an unimportant part?—I do not think it plays a very important part; in most of the cases which have come under my observation the disease has ceased to proceed very far. The lung becomes adherent to the chest wall. It does not appear to spread; it gets to a certain stage and then stops, and other troubles come on.

6066. Do you think that, sooner or later, a very large number of these cases are affected to some extent with tubercle, although tubercle plays a subordinate part in them?—I mean they seldom die as they do in tuberculous cases.

6067. But probably tubercle bacilli would be found in the expectoration?—Yes, but it is the exception.

6068. Although tubercle bacilli might be found in the expectoration, that would not prevent you diagnosing the case, would it, as one of dust phthisis?—It would not. You have not the sweating and temperature and constitutional disturbance, nor much wasting. Another trouble which I forgot is dyspnoea at night time.

6069. The mere fact then that tubercle was found in the sputum would not prevent your considering the case one of dust phthisis?—It would not.

6070. Now, between the chronic fibrosis on the one hand and ordinary tuberculous phthisis on the other, is there an intermediate group of cases the interpretation of which might be very difficult, I mean, in respect of causation by dust? In the case of a person perhaps somewhat susceptible to consumption going into an employment of this kind, might dust determine in him the occurrence of tuberculous consumption of an ordinary kind, which under other circumstances you would not have expected?—Of course, that would be a different thing altogether. I would not consider that as a case which would come within the limits of a compensation Act.

6071. Supposing it were alleged in a court of law, and you were asked as to a certain man, "Do you conceive the inhalation of dust has had anything to do with the irritation of a case of ordinary tuberculous consumption?" what would your answer be?—My answer would be, if the tendency was there prior to his going into the employment, the irritation caused by the dust might start the trouble, but that he might get the same trouble from any other employment or even if he got a wetting. I should not consider his death would be due to his employment.

6072. Do not you think that a large proportion of the cases would be on the intermediate ground I am speaking of?—It would form a difficult and large group to deal with.

6073. There might be little doubt about a young man of 25 and 30, or, again, as to the fibrotic man of about 50, but if the man were aged 40 or 45, and presented chronic tuberculous phthisis in both lungs, should you be prepared to state to a court of law the degree in which the dust was culpable in the individual case?—No.

6074. Then probably in the majority of cases the discrimination would be a difficult one, would it not?—Yes. I should take the temperature and the constitutional disturbance and the sweatings.

6075. No, I am assuming it is tuberculous phthisis, but I want to see how far the dust may be a con-

tributory cause?—I would not be prepared to say in a court of law that it was due to the dust to any large extent.

6076. Apart from your evidence, I should have been disposed to say that clear cases of fibrosis are rather scarce; what do you say?—I have seen a good number, and I have seen a good number of post-mortems in which fibrosis has occurred in colliers only.

6077. You think, do you, that in your district there is a substantial number of cases which are clearly cases of dust phthisis?—Yes, I do.

6078. So that there would be a substantial matter for compensation even if we left out all tuberculous cases?—Yes, I do think that.

6079. Two members of the Committee examined some 30 men engaged in tool-grinding at Wolverhampton, and formed an impression that a very large number of them had imperfect respiration, and some had slight added sounds. They were men with large muscular chests. Should you be disposed to think that if one could see their lungs, they were probably more or less fibrotic?—It would depend on their ages.

6080. Have you seen that state of the chest in a great number of men who work in the dust in your district?—Yes.

6081. You would not be surprised to find chests of that kind among them?—No.

6082. It is in accordance with your experience?—Yes. I have no experience as to grinders.

6083. Do they suffer from hæmoptysis?—Very seldom. Perhaps occasionally you might get one to say he has spat blood at some time, but you would not say definitely that it was hæmoptysis. I have never seen it, and some of the cases are extremely chronic.

6084. Extending over ten or fifteen years?—Yes, or more.

6085. How far is it incapacitating? At what age would it affect a man seriously?—It would not affect a man until the heart trouble was well established, and that might be not for 10 or 15 years.

6086. Do the men regard their employment as one which shortens their lives?—No, they do not.

6087. Do they drink more than other workmen?—No, they do not drink as much as chemical workers.

6088. They are not an intemperate class?—No, they are not. They simply take drink at the week end.

6089. Have you ever carried a post-mortem examination into microscopical detail?—No.

6090. Could you say whether silicious dust is found in the lungs?—No.

6091. At any rate the men so employed probably would be incapacitated at an earlier age than persons employed in an atmosphere free from dust?—Yes.

6092. And though they might go on working to 55, in some other employment, they might have gone on a few years longer?—Yes, that is my opinion.

6093. Would you expect any great difficulty as a referee in these questions, in separating the cases which you conceive to be those of dust phthisis from ordinary tuberculous phthisis?—No.

6094. (Dr. Legge.) With regard to the intermediate class of worker referred to who gets affected, would you say that there was a definite length of time that it took before the effect of the dust showed itself on the lungs?—No, I could not say that. I would not regard those cases where there was constitutional disturbance or expectoration with tubercle bacilli in large quantities, or night sweats, or rapid wasting as cases which should come under the Compensation Act, although the disease might have sprung into existence from the coal dust.

6095. Taking the case of a man aged 20 who has worked for five years as a collier, and develops phthisis lasting six months or a year, would you say that that was a claim that could be maintained?—No, it would not, in my opinion.

6096. What becomes of the dust which these workers inhale?—It becomes deposited in the lung.

6097. I suppose the amount of dust they really inhale through their mouth and nose in the course of a year would amount to a very considerable quantity?—Yes. Of course they expectorate a lot of it.

6098. What happens to the bulk of the dust?—They expectorate it. Colliers' lungs are frequently perfectly black.

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6099. Is it a very minute quantity of dust which eventually finds its way into the lungs?—Yes.

6100. Do you think such a small amount as that would act as an irritant?—Continued for a considerable time, I do think it would.

6101. What length of time, if it is continuous inhalation, would you fix before it would become troublesome?—I should say 10 years before you would have any trouble set up with regard to fibroid phthisis. I have never seen evidence of it in colliers under 40 years of age, so that I should say 10 years at least.

6102. Do you think any case up to 25 years of age could be without question excluded from compensation?—Yes, I do think so.

6103. In the late cases where you get purulent expectoration, and you had bacilli in the sputum, surely you find also night sweats and hæmoptysis?—In fibroid phthisis the purulent expectoration is due in my opinion to retention. When you find bacilli in the sputum it is due to the development of tuberculous phthisis, and there of course you have night sweats and constitutional disturbance, etc. In fact, the men seldom die of phthisis, but die of the heart trouble or dropsy, renal dropsy.

6104. In the post-mortems you have made, have you ever found signs of cavities or excavation of the lung?—No, not in cases of fibroid phthisis, except where tuberculous phthisis also existed.

6105. And yet you say you find tubercle bacilli in such persons?—Yes. I have had the Medical Officer of Health giving me his return of examination of sputum, and certifying tubercle bacilli.

6106. Are you talking of more than one case?—In very few of the cases do you get the tubercle bacilli, but I had one some time ago under my care, and he is still under my care. He has tubercle bacilli and he has cavities.

6107. Do you think if these people were to give up the work when they found the symptoms so serious as to consult you they would get better provided you found no tubercle bacilli in their sputum?—I do not think they would.

6108. Do you think the mischief has gone too far?—Yes.

6109. Supposing you saw them five years before, while the mischief was only in the making, do you think then that the lung would heal up completely?—No, I do not think so, but if placed under better conditions, life might be prolonged.

6110. So that if at the age of 35 they gave up the work there is no reason why they should not live 15 or 20 years more instead of only 5 or 10?—I see no reason why they should not.

6111. Have you known of men who have left the work at 35 and taken up other work?—No, they will not do that. You will not get a collier to leave his employment. There are so few branches of employment for them—only labourer's work which is badly paid, so they will not go into that; and even if they go into chemical works they require to have some training for it.

6112. Do you think a periodical examination of these workers once every six months, with power to suspend men who are beginning to show signs of the disease

from the work, would be useful?—Yes, I should think it would.

6113. Except that there is a difficulty about their finding other work?—Yes, there is that to contend with.

6114. With regard to bottle blowers, is there any other sign besides emphysema that goes along with it that would enable you to say whether a person presented before you with emphysema was a bottle blower or not?—They would have chronic bronchitis with the emphysema.

6115. Is there any special sign by looking at a man which would enable you to tell he was a bottle blower?—No.

6116. I was thinking of the effect on the cheeks?—The cases I have met are practically isolated cases, because at the bottle works they have a doctor appointed specially for the works, and I do not see them.

6117. Is it a fact that bottle blowers get a distention of their cheeks and that their cheeks become flabby?—I have not noticed that very much.

6118. And you have seen, I suppose, many bottle blowers who have been at the work 10 or 15 years?—Yes, hundreds of them.

6119. (*Professor Allbutt.*) In speaking of the intermediate cases of phthisis, do you consider that tuberculous phthisis apart from fibrosis is unduly prevalent amongst the class of people of whom you are speaking?—I do not think it is.

6120. You believe it to be the ordinary incidence of workers in general?—Yes, I think so.

6121. As regards emphysema, that would be the same, I suppose, as the emphysema of persons who play on wind instruments?—Yes, it would be the same.

6122. What does it amount to in respect of capacity; after a certain number of years does a man cease to be able to blow glass on account of his emphysema?—Not until he gets heart trouble, which takes a great number of years as a rule to develop.

6123. Do they work as long as other people?—They do.

6124. You could not say that it shortens their working life as glass blowers?—The heart trouble of course does.

6125. Do you consider that their years as glass blowers are shortened by emphysema? For when you come to compensation, you see, it is a question of how many years a man has fallen short of his anticipated earnings?—My opinion is that the bottle blower would have lived longer if his employment had been different.

6126. Are they fairly temperate men?—Glass workers and chemical workers are given to drink a good deal.

6127. Is the emphysema attended with bronchitis?—Yes, it is.

6128. From an early period?—No, they do not have bronchitis at an early period. In the cases I have had they have not had bronchitis long.

6129. Bronchitis comes on at a later stage, does it, and at a later stage still comes the heart disturbance?—Yes.

6130. Is there any general arterial deterioration?—No.

6131. It is not part of a general senile change?—No.

TWENTIETH DAY.

Thursday, 7th February 1907.

PRESENT :

Mr. HERBERT SAMUEL, M.P. (*Chairman*).
Professor CLIFFORD ALBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. JUDSON S. BURY, M.D., called in and examined.

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6132. (*Chairman*.) You are a medical man in practice?—Yes.

6132*. In what town?—In Manchester. I am physician to the Infirmary, and practise as a consulting physician in Manchester.

6133. And you have had some experience of various trade diseases?—Yes.

6134. Have you had experience of poisoning by carbon monoxide gas?—To a very limited extent. Until last year I had not seen a case for 16 years. The cases that I saw then were under the care of the late Dr. Ross at the Manchester Infirmary. There were two cases came in of peripheral neuritis which Dr. Ross, from an analysis of the history, thought were very likely to be due to carbon monoxide. Those cases are recorded in a treatise by Dr. Ross and myself.

6135. And there was one recent case?—There was one recent case of great interest which I had in the Infirmary last year.

6136. In what trade was the man employed?—He was a worker at limekilns. Would you like me to read the history of the case shortly?

6137. I think it would be very useful?—He was a man aged 25. His occupation is put down here as "labourer." On June 7, 1905, patient had to clinker a kiln which was at the base of a tall chimney, and partially enclosed. It was a very hot afternoon, and the construction of the kiln made it necessary for the man to get his head inside the enclosure to see what he was doing. He suddenly staggered and fell insensible, and remained so for about an hour, when he was taken home. When seen at 7 o'clock at night on the same date he had a dazed look, but answered questions intelligently, and there were no external marks of injury. The next day he complained of headache and vomited. On the following day he had what was described as a fit. He lay with his eyes closed and knitted brows, and took very little notice, and it was difficult to get him to answer questions. During the next few days he presented the symptoms of lepto meningitis, took no notice of questions, and evidently had severe headache. His neck was rigid, and he occasionally vomited. The temperature was always above normal, ranging between 99 and 101. The abdomen became boat-shaped; the pulse was intermittent, about 60; the pupils were unequal; the coma deepened; he had occasional convulsive movements of the right arm and leg; and the urine was sometimes passed involuntarily. That is the condition as described by his doctor before we saw him. He remained in that condition for 10 days, from June 9 to 19. Saline solution was injected into his right median basilic vein and this was followed by a slight improvement; he began to take notice of his surroundings; made the attendant understand when he wanted to urinate, although his motions were occasionally passed involuntarily. There was now a right hemiplegia, and his speech was very indistinct. Slow but steady improvement set in. Power gradually returned to the right arm and leg, but his mental condition remained unsatisfactory. He had occasional fits of irritability, and anything like a mental effort of the simplest kind confused him. Then he came under my care at the Infirmary on January 10, 1906.

6138. That was six months later?—Six months later. He had a slight right hemiplegia; he had albuminuria and albuminuric retinitis. The striking thing about him, however, was his mental condition.

6139. (*Professor Allbutt*.) He had no peripheral neuritis?—No. The whole question in this case is as to whether his mental condition was due to carbon monoxide or not. We made the most careful inquiries, and he was in perfect health and quite sensible and intelligent up to the time of his putting his head into the kiln; and his mental condition afterwards never seemed to get quite right. He was always in a very strange condition in the Infirmary—childish—feeble-minded perhaps would summarise it the best. Of course, it is very easy to criticise the cause of this mental condition; but those are the facts that we could ascertain—that he was quite well before, and that his mental condition was impaired afterwards.

6140. What about the blood examinations?—I do not know that they were made.

6141. At a later date there was no specific alteration of the blood?—No.

6142. (*Chairman*.) There was no other cause for his condition except this poisoning by carbon monoxide?—I could not find any.

6143. Was there any reason to suppose that there was any other gas developed in this place where he was working?—No, I could not get any clue to anything else.

6144. At any rate, this particular case would fall rather under the category of accident than of disease, because the seizure was sudden and at a given moment?—Quite so, and it followed immediately after the exposure to the carbon monoxide.

6145. Therefore from the standpoint of this Committee it would be hardly necessary to come to any decision upon it, because it would already be covered by the Workmen's Compensation Act as an accident?—I see; yes. Of course there have been other cases recorded—chronic cases of impaired mental condition following exposure to carbon monoxide.

6146. (*Professor Allbutt*.) That is where it comes in?—Yes, and that is why perhaps one attaches more value to this case.

6147. (*Chairman*.) You say following exposure to carbon monoxide; would that be momentary or continuous exposure?—I could not speak to that just now; I should assume prolonged exposure—several exposures—but I do not know. Of course, such cases are very rare, and very few people have had any experience of them.

6148. (*Dr. Legge*.) In those two cases you refer to that you saw with Dr. Ross—there was no unconsciousness in them?—No.

6149. So that those could not be regarded as accidents?—No, those were cases of peripheral neuritis. Shall I give an abstract?

6150. I think so, and mention also the form that the paralysis assumed?—One was a man aged 50. Alcohol could be absolutely excluded. He was working at a new patent for making gas for lighting purposes. He stood over the retorts whilst replenishing them with

coal, and therefore had to inhale a great deal of the gas, and he was much exposed to the fumes whilst clearing the furnace. In a few months he began with pain in his right side and shortness of breath, and he left off work for six weeks, and then resumed it. His former symptoms returned, and after a few months he began to have shooting pains in the legs and arms, and his legs became so feeble that he had to leave off work. Two years from the onset he came to the Infirmary.

6151. (*Chairman.*) The Manchester Infirmary?—The Manchester Royal Infirmary, under the care of the late Dr. Ross.

6152. You were there at that time?—Yes, and he presented typical multiple neuritis of both arms and legs. The heart was enlarged, and the blood showed changes of ordinary anæmia. There was no albumen in the urine. Six months after admission and one year after leaving off work he was convalescent, but he was still unable to work, though the prospect was good. The points about the case are (in addition to the peripheral neuritis) the presence of anæmia and breathlessness in a man who had been previously healthy and temperate.

6153. (*Dr. Legge.*) Was there any mental defect in that case; I think you said that his face was quite expressionless?—That was due to the weakness of the muscles themselves. I do not think there was any mental defect.

6154. No affection of the voice?—No, I do not think so.

6155. (*Chairman.*) And the other case in the same period?—In the other case the man was aged 43. He was a furnace-man, and he was much exposed to the fumes of burning coal.

6156-7. (*Professor Allbutt.*) What date is this?—1889. His symptoms were almost identical—that is, he had anæmia in addition to the peripheral neuritis, his heart was also a little enlarged, and he had no oedema of the legs and no albumen. I have made a note that they were both healthy men, and not exposed to alcohol or any other poison we could trace.

6158. (*Chairman.*) And did he recover?—Yes, he recovered.

6159. Between 1889 and 1906 were you at the Manchester Infirmary all the time?—Yes.

6160. You had no other case which was diagnosed as being due to some other cause which might possibly have been due to carbon monoxide poison?—No, I think I should have diagnosed it.

6161. Are there symptoms which you have described as being attributable to the poisoning by this gas such as to render it at all likely that cases really due to carbon monoxide have been attributed to some other cause? Are they really distinctive symptoms?—No, I cannot say that they are.

6162. So that other cases may perhaps have occurred and been attributed to ailments prevalent amongst persons not working in these occupations?—Quite so. Of course it is in the acute stage where you meet with the characteristics.

6163. On the other hand do you think it is possible that these cases were really not due to poisoning by this gas, or do you regard it as certain?—I think the probabilities are in favour of them being due to the gas.

6164. You would not go further than that?—No; for my experience of such cases is so limited.

6165. For instance, the case of the man who was working in a kiln?—I was inclined to think in that case certainly that carbon monoxide had a great deal to do with it. I could not be quite sure, because it was complicated by albuminuria and indications of kidney disease.

6166. Was the air of this kiln tested for carbon monoxide, or is it certain that carbon monoxide was there in considerable quantities?—No, I never heard it was tested. It was a long way from Manchester.

6167-8. Was it known that there was carbon monoxide in the air?—No, I never heard anything about it.

6169-70. So that the carbon monoxide diagnosis was derived simply from the man's symptoms?—And from the history—from the probability that there was carbon monoxide; that would be the gas that would be most likely to be in the kiln.

6171. (*Dr. Legge.*) I think so, in a lime kiln.

6172. (*Professor Allbutt.*) That would be the presumption, certainly.

6174-5. (*Professor Allbutt.*) There is no hospital for not know; it does not say so. "The patient had to clinker a kiln which was at the base of a tall chimney which was partially enclosed." I think it was in active work.

6175. (*Professor Allbutt.*) There is no hospital for nervous diseases in Manchester?—No.

6176. So that nervous diseases go to the Royal Infirmary?—Yes, we get a large number from this district.

6177. (*Dr. Legge.*) You are a medical referee under the Workmen's Compensation Act at the present time, are not you?—Yes, I get one case about every three years, or something of that sort.

6178. Supposing that the chronic effects of carbon monoxide were included in the schedule as a disease, do you think that there would be any likelihood of cases of paralysis which were not due to carbon monoxide poisoning being attributed to it?—There would be always that danger. It requires the highest scientific skill to determine; and there would always be a danger.

6179. Even when the highest scientific skill was exercised by the medical referee?—It would reduce the danger. We are always open to the danger; still there would be cases which would be definite.

6180. What is your own opinion as to the point? Do you think it should be included in the schedule?—Is not that rather outside a medical answer? Does not it include so many other things?

6181. (*Chairman.*) Perhaps so.

(*Witness.*) I think if those symptoms developed certainly from carbon monoxide, then, of course, it would be a great hardship to those employed that they should not be included.

6182. (*Dr. Legge.*) There might be cases where there is temporary unconsciousness followed by recovery, and then four or five months later you may have mental symptoms developing, and it would be difficult to regard such a case as an accident?—Quite.

6183. There are such cases, are there not?—Yes, that is so. But, of course, we are trying to formulate a mode of procedure on such slight evidence—that is what seems to me with regard to carbon monoxide. Taking it as a practical thing, we do not come across it in practical work. Years pass by without coming across a case. We see a great variety of cases at the infirmary, and yet rarely see instances of poisoning by this gas.

6184. You do not agree with the statement that has been made that people working where there is a slight escape of gas, say, from gas irons in laundry works, suffer from anæmia and debilitating effects due to carbonic oxide poisoning?—I suppose so, but I could not speak to that.

6185. You have not personal experience?—Perhaps because one is not working in that direction. No doubt cases occur, but do not often come prominently before one.

6186. (*Professor Allbutt.*) You mean many of such cases may have come before you, but there was nothing specific about them to attract your attention?—That is so.

6187. I may go a little further than that and ask whether you think if your attention were called to it there would be any specific sign by which you could diagnose it?—I should not think so in a chronic case; it would be represented chiefly by some variety of anæmia.

6188. Do you think any examination of the blood might give you any notion of the cause?—I do not think so.

6189. To schedule the cause of a disease of this kind means a certain amount of legislative machinery; do you think that the reason for putting it in force is almost too slight?—I should not like to say that, especially after what Dr. Legge stated with regard to the debility and anæmia from which such patients may suffer.

6190. You have not come across such symptoms among private patients as due to gas stoves and gas

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fires?—I think that I have seen such cases, but they are not common.

6191. (*Chairman.*) With reference to poisoning by carbon bi-sulphide, have you had any cases under your notice?—None, except two that came about the same period to the infirmary; they were under Dr. Ross at that time. I have made careful inquiries at Mandelberg's, in Pendleton, a large mackintosh works, and they have had no illness at all for many years.

6192. (*Professor Allbutt.*) That is an indiarubber works?—Yes. They do not know of such a thing. There is a man I know there very well. I went into the subject with him, but he assured me there was nothing at all.

6193. (*Chairman.*) You have not had any cases in your hospital?—No; I have had none since 1889, or about then.

6194. You have not heard of any cases elsewhere?—I have not.

6195. With reference to naphtha poisoning in indiarubber works, have you had any cases of that?—There are one or two doubtful cases recorded there. I do not quite know what naphtha is chemically.

6196. (*Dr. Legge.*) It is sometimes known as benzine?—It is a popular phrase; I do not quite know what it is.

6197. (*Chairman.*) You have no reason to believe, from your own knowledge, that in the indiarubber trade there is an industrial disease caused by naphtha?—I do not think so now, but the smell of naphtha itself is quite a healthy thing—there is nothing really injurious about it.

6198. (*Dr. Legge.*) In this case that you refer to in your book the worker was also working with carbon bisulphide, was he not?—Yes, that was one of Dr. Ross's cases; he analysed it. He thought it was due to naphtha rather than CS².

6199. The symptoms were similar to those you would expect from carbon bisulphide?—Yes; but the man at Mandelberg's simply smiled when I asked him about naphtha, and thought it was quite a healthy room where there were fumes of naphtha about.

6200. The symptoms from carbon bisulphide are quite definite and distinct, are they?—They were in those cases apparently.

Mr. SIMEON SNELL, F.R.C.S., L.R.C.P., called in and examined.

Mr. S. Snell,
F.R.C.S.,

6217. (*Chairman.*) I think you are ophthalmic surgeon to the Royal Infirmary at Sheffield?—Yes.

6218. And Professor of Ophthalmology at the University at Sheffield?—Yes.

6219. You have made careful inquiry into the alleged prevalence of cataract amongst glass-workers?—I have.

6220. Are there many glass-workers in Sheffield?—I think, as far as I can make out, it is one of the largest centres in the country. I think there are about 6,000 within a fair area.

6221. And a considerable number of them are bottle-finishers?—They are bottle hands; the bottle-finishers form only a portion of them.

6222. It is stated that it is the bottle-finisher who is specially liable to cataract?—I do not understand that. That is not a result of my inquiry. Of course, the bottle-finishers are the older hands; it is the older people that get it.

6223. There are several processes?—There are several processes. They begin as boys, and they gradually work up till they get to be bottle-finishers. The bottle-finishers in a bottle works are the best-paid workmen and the more experienced workmen.

6224. It is the question of the workman's age, not the process in which he is engaged, which, in your opinion, makes him more liable, if at all liable, to cataract?—I think so. I would rather put it in this way—that I have inquired, as I think, tolerably thoroughly into the subject, and I do not find the frequency that has been alleged.

6225. When were your inquiries made?—Might I put it in my own way?

6226. Yes, do.—I have lived in Sheffield for something like 25 or 30 years. I have had the appoint-

6201. (*Professor Allbutt.*) I think, Dr. Bury, you are of opinion that those cases arose more frequently, and were more severe in former times than now; that under the improved conditions under which these trades are carried on they have become rarer?—I should like to make that observation with regard to CS² certainly. Carbon monoxide is more indefinite.

6202. We have had very startling stories about the action of bisulphide of carbon in former times?—Yes; I remember a case about that time, in which a man had a maniacal attack.

6203. And the cases were not a few?—Yes, the mental symptoms were very prominent.

6204. Do you as certifying factory surgeon examine the workers periodically in indiarubber works?—Yes.

6205. About how many workers?—There are very few at Mandelberg's.

6206. Half a dozen?—Half a dozen, roughly.

6207. You have seen those men now every month for the last four or five years?—Yes.

6208. Have you not been able to detect symptoms?—No, nothing at all.

6209. No weakness in the grasp, for instance?—No.

6210. Are you a visitor at Cheadle?—Yes.

6211. You have not heard anything there of mental disease due to this occupation?—No.

6212. Nor, indeed, to any occupation or any trade?—I do not think so, for I think one would have heard of it.

6213. (*Dr. Legge.*) Supposing these regulations were relaxed, there is no reason why the symptoms should not be as severe as they were formerly?—Quite; I should think so.

6214. Do you know of any fresh industries in which carbon bisulphide is being used?—No, I do not.

6215. (*Chairman.*) Does your experience suggest to you any other diseases to which various employments might give rise, besides those you have mentioned, and besides those which are already scheduled to the Workmen's Compensation Act?—No; I cannot think of any just now.

6216. You have nothing to suggest for further inquiry by the Committee?—No.

I hold at the Infirmary for something like 25 or 26 years, I think, and there I have dealt with people not only from Sheffield, but the whole of South Yorkshire and a good part of the West Riding; and this bottle-making industry is situated in this district, and is situated in towns and villages from which constantly patients are coming; and, as I have heard from time to time that it has been alleged that bottle hands have suffered from cataract, I have put in writing on two or three occasions that, though I have lived in this district, I have not been familiar with it.

6227. (*Professor Allbutt.*) How long has it been alleged—some years?—I should think 20 or so by the Germans. I wanted to ascertain whether my observation from practice was correct or not. Then I went to glass works, bottle-making works, inquired into the processes, examined the men, made inquiries of the men, and the result of the whole of this is published in this paper of mine—the whole of this inquiry.

6228. (*Chairman.*) In the "British Medical Journal," January 5, 1907?—Yes; that I should like to put in as practically my evidence.

6229. I think the members of this Committee have all read it?—There I examined the kind of work pursued, and in the course of those inquiries I examined 100 men.

6230. Did the men use goggles or any other protective appliance?—No, I do not think so. Then I inquired of the managers and other people I met with as well as the men as to frequency, and they did not seem to know very much about it. Then the next stage of the inquiry was that I directed letters to the heads of 15 works. The result of the inquiries is put here in the "British Medical Journal." Identical questions were issued to all of them. I got replies from nine, which,

taken with the two works which I visited, means 11 answers.

6231. All those answers were negative?—Yes. This is a sample: "I have no knowledge of any case of cataract during an experience of over 50 years," and so on. Then I thought that another point in the inquiry would be to obtain some information from a sick society dealing with these bottle hands. That I had very great difficulty in getting hold of. I could get particulars of other trade societies, the unions and so on, but that did not help. I got hold ultimately, however, of a sick society, not a very large one, which had been established over 30 years. During this time there had been 463 members. Of this number 285 had at various times been receiving sick pay, but only one during the whole period had undergone an operation for cataract.

6232. That is a trade society amongst glass bottle makers?—A sick society, not a trade society.

6233. A sick society limited to bottle workers?—That is right.

6234. (*Professor Allbutt.*) That is about the normal incidence?—It is not extraordinary at all. I admit it is a very small society; but then the bottle industry is not a very big industry in this country. I do not know how many are engaged in it—30,000 or 40,000, is not it?

6235. (*Dr. Legge.*) I think about that.—Then another way of considering it was the age of the people in which cataract was alleged. Then I find on inquiry into the cases that Dr. Robinson published, for instance—that is the only way I have got of going by any cases in England—the ages of them he gave were 59, 59, 59, 53, 40, and 55. Three of those—that is, one at 59, another at 40, and another at 55—were not operated upon; the cataract was only incipient. Then the only four cases I could find in my practice in the last six years to compare the ages with were 55, 64, 59, and 66. The ages of those do not differ from the ordinary run of the cases. I took out from my Infirmary records 1,042 consecutive operations for cataract. Out of that number 668 were men, and it works out that that is about the age—about 60, or just under or over; and that I think is about the average age for cataract, as far as I know, everywhere.

6236. (*Chairman.*) How many of those cases were bottle finishers or bottle workers?—Only four; but I cannot declare positively that those are the only cases that came to me, because the employment has not invariably been entered.

6237. You have not any statistics showing in how many cases the employment was recorded of those 600 odd?—I have not got it here—I do not know that I have it at all. It does not help me personally at all unless I have it as applied to all of them.

6238. Have you any reason to think that the process in the Sunderland district is in any way different from what it is in the Sheffield district?—I have evidence of a man quoted in my paper. Of course I know nothing about the Sunderland district. He is a man aged 56—has worked in many places in England, Scotland, and Ireland—has been acquainted with about 2,000 bottle hands. He told me he had worked in the north, but I do not know how far it differs—I do not know that it differs very materially.

6239. You have not made any inquiry into the point whether there is any difference in the process which would be at all likely to render cataract less frequent in this district?—From what this man told me I do not think so. I take this statement: that in 1902 out of 75 cataracts there were 18 of them among bottle finishers. If that statement be correct it means this: that out of the 200 or 300 bottle finishers who are stated to be in that district, taking the number to be 200, there will be a percentage of 8·5 of those not only suffering from cataract, but ready to undergo operation, which is a very large percentage; and if 300 be correct there were nearly 6 per cent.—that means ready for operation, but it means a very much larger number of people that are suffering more or less from impaired sight; because cataract may go on incipiently for many years.

6240. Those 18 cases were an accumulation, were not they?—I do not know. I got the hospital reports, and I found out that in the next year the senile cataracts were 63. Six of those were among bottle finishers. In 1904 there were 76 and

two were bottle finishers. The next year there were 87 and two were bottle finishers. Then I had information that in the last year (1906) there were none at all.

6241. Have there been any recent inquiries into this matter in Germany as far as you are aware?—Not very recent I think. I think three or four years ago.

6242. What was the conclusion arrived at there?—I have in my paper three sets of results. Meyhofer found it prevalent among young people about 26 years of age and engaged in glass works. Hirschberg found it prevalent amongst people about 40. I had better give you the exact figures. Meyhofer found it prevalent amongst people of 28 down to 24. His other investigations bore out the frequency of the affection in young workers.

6243. When was this?—I cannot give you the exact year.

6244. (*Dr. Legge.*) You gave the date of 1886 for Meyhofer?—That is about it. Then Hirschberg went into the subject some years later—I cannot tell you the exact date.

6245. You mention here 1898?—Thank you. He found five cases of 40 and over. Two had been operated upon when he published his paper, and three had not advanced so far.

6246. (*Chairman.*) Have you any further information with regard to inquiries in Germany?—No, but I mention another paper by a doctor named Pröbsting; it is a very short paper indeed.

6247. From any other country?—There is a doctor named Evitzki, in Russia. He investigated the workers, and found only four affected in 70, the ages being 43 to 56, and he says that is a period in which cataract is observed even under the most normal conditions.

6248. Do you find such a large proportion of cases at that comparatively early age in persons not engaged in this trade?—Among my cases previously mentioned out of 668 there were 67 between the ages of 40 and 50, 159 between 50 and 60—it is not infrequent. Then I may say this: Hirschberg laid stress upon the exposure to heat. He had been in the East Indies, in Calcutta and other places, and he states that the people operated upon for cataract were younger there than they would be in Europe. I investigated that subject. I wrote to Dr. Drake-Brockman, who has had a very large experience in the East, and it came out to what I anticipated: that the Hindoos, for instance, mature earlier and die earlier, and cataract may come on earlier. It is all given here in my paper. Mahommedans who have lives about equal to other people have cataract when it comes at about the usual age.

6249. Has your experience led you to the conclusion that any other processes tend to cause affections of the eyes?—I have done a lot of work among steel workers, and I looked up my records, and cannot find that exposure to heat amongst them produces cataract.

6250. (*Professor Allbutt.*) Heat or light?—Heat or light.

6251. (*Chairman.*) Or any other trade?—I do not think so.

6252. There is no trade process which affects the eyes?—There are many trades that affect the eyes; there is electric welding, for instance—exposure to electric light, but not producing cataract.

6253. How does that affect the eyes?—In electric welding the light is most intense. The employes protect their eyes from the intense light with large shields with glass in the centre, arranged in alternate layers of blue and red, of four thicknesses. If a man were exposed to the light, or, as he calls it, "catches" the light, the effect is soon noticed, but the worst does not generally come on until some hours afterwards. The most acute stage is during the night succeeding the exposure.

6254. Does that incapacitate for more than a week?—Fortunately, for not more than a few days.

6255. It never incapacitates for more than a week?—I do not know positively, but for some days.

6256. (*Professor Allbutt.*) It is the conjunctiva?—Yes; whether exposure of the retina has anything to do with it I do not know. To all appearances, it is confined chiefly to the conjunctiva and cornea, but it is very possible also that it occasions hyperæmia of the retina.

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Mr. S. Snell, 6257. Is it the same as the old and familiar snow-blindness?—I think so. I worked that out, but whether it is the chemical rays or the heat rays is uncertain, but I think it is held to be due to the chemical rays.

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6258. (*Chairman*.) There is no other case you would wish to draw attention to in which workpeople are injured in their eyes through the employment in which they are engaged, their disability lasting beyond a week?—I mentioned, when giving evidence on a former occasion, di-nitro-benzol. I have also investigated the effects of bi-sulphide of carbon in rubber works, and I have inquired into other trades.

6259. (*Professor Allbutt*.) Will you describe the affection?—It affects the eyes a variable time after exposure to the bi-sulphide. In some, changes were found at the optic discs, and in others not so.

6260. Would it incapacitate for employment?—Very much.

6261. Do you find it as a single symptom, or is it always combined with other symptoms of poisoning?—I think there are usually other symptoms with it, but I have not myself come across cases lately. Some few years ago—it may be ten years ago—I investigated it in one or two rubber works. I think the process of rubber-making is very much improved now, and is less hurtful to the employés.

6262. You have not come across any cases for some time?—No, I am not quite in the way of coming across cases now. The only rubber works I know are at Retford, and I made investigation there some years ago.

6263. Is there any quite distinct symptom that arises from carbon bi-sulphide poisoning?—Yes, it has just the character of cases of what are called toxic amblyopias—that is to say, the blindness arises from a poison getting into the system. There is a scotoma in the middle—the sight is worst in the centre—and in that centre there is an affection for colours; red, for instance, is not seen as that colour. If a person looks straight in front of him, and you hold before him a little red disc, he does not see it as red; he sees it as a dirty brown colour; but if you move it a little to one side he will see it as red.

6264. Such characteristics you say arise from poisoning by nicotine?—Yes, in some ways very similar.

6265. In any particular case you could hardly tell whether a man had been over-smoking or engaged in the bi-sulphide process?—You would have other general symptoms with it very often.

6266. You would not come across cases in which the only symptom of carbon bi-sulphide poisoning was one concerning the eyesight?—I think so. I am speaking from recollection. I have published all this in Dr. Oliver's "Dangerous Trades." Speaking from memory, I think there are cases like that. I think I have seen them—I am not sure.

6267. Is it alleged that there is anything in the anatomical character of the cataract itself in glass bottle-workers which differs from ordinary cataract?—I have not seen any difference.

6268. Speaking as an expert, you are not aware of any such difference?—I am not.

6269. (*Dr. Legge*.) Professor Allbutt asked whether it was alleged—I do not think he quite got the answer. You gave your own opinion?—I think it has been alleged that there is a difference.

6270. (*Professor Allbutt*.) I was speaking to you rather as an expert?—In the cases which I have met with—and they are not many—I have not seen a difference. If I may put it in my way, I think what you mean is this: Supposing a man comes to me with cataract; I know nothing of his occupation; is there anything I can find out to tell me whether he is a bottle-maker or not? I know nothing.

6271. There is nothing in the cataract itself which would be peculiar?—No, I do not know anything from which you could say in a bottle-hand or bottle-worker that cataract is due to his occupation rather than to natural causes.

6272. (*Chairman*.) In those cases of bottle-finishers you have had under your notice?—I do not think they were finishers; one or two were glass-blowers.

6273. In those six cases of glass-workers you had under your care for cataract did you look to see whether the distinctive symptoms suggested by Dr. Robinson were present?—No, I recollect one man

where it was incipient; in the others I believe they were ready for operation.

6274. I am not sure I have the medical term—it is posterior cortical cataract?—Yes.

6275. Did you look to see whether that was so?—There is nothing I have seen which occurs to me as peculiar about it.

6276. (*Professor Allbutt*.) You do not recognise anything in his description which would strike you as of a special character?—I do not think so. What I should like to say positively about this point is: Supposing I go to the infirmary to-morrow, and a man presents himself—it may be a bottle-hand—with cataract ready for operation, how am I to say that is due to his trade?

6277. (*Chairman*.) Unless it is a cataract of this peculiar description? Is posterior cortical cataract distinctive?—Not distinctive in this class of men; it is of frequent occurrence otherwise.

6278. It is not very rare?—I think it is a question of the observer. As far as I understand this inquiry is to ascertain whether they should be scheduled or not?

6279. Yes?—The difficulty would present itself to my to say whether the cataract was due to the man's employment. I could not say it on the evidence that I have got. Even if the evidence were very much stronger I do not see how I could say in any case, "Well, my good friend, you are entitled to compensation."

6280. You are of opinion that there is no distinct posterior cortical cataract which can be termed glass-worker's cataract? There is no such thing as posterior cortical cataract distinct from ordinary cataract?—Cataract begins in various ways. Supposing there is anything distinctive you could only ascertain it in the early stages. You might have to keep a man under observation for years, as frequently cataract develops very slowly.

6281. To tell whether it was posterior cortical cataract or not?—Yes, because when he comes ready for operation, it would often be difficult or impossible to say that the cataract commenced in the posterior pole; it is only in the early stages that cataract can be recognised as beginning in that way.

6282. (*Dr. Legge*.) He says all the incipient cases were posterior cortical cataract?—I take it that when it is advanced ready for operation, or when the period of compensation would begin, and he would be so incapacitated from doing his work, you would hardly see those peculiarities if they existed. To a lay mind that is not perhaps very clear.

6283. I think it is?—It is the crystalline lens. If the cataract begins at the very back, as the opacity increases it gets all the way round to the front as well. Nobody can say positively after a time which way it began. When a cataract is so far advanced as to incapacitate a man from work so as to entitle him to compensation, it would be very difficult in many cases to say where it began.

6284. Do you know whether the German writers on the subject have declared at all on this point as to the kind of cataract?—I have only a reference, I think, to Meyhofer, who has mentioned soft cataracts in young men.

6285. That is quite a different thing?—That is quite a different thing. There is a wide discrepancy between the investigations. Meyhofer's are young people. Hirschberg's are 40 years of age and over, just under the ordinary age when it usually occurs. Those at Sunderland are the ordinary run of the age; whether they are glassworkers, steelworkers, agricultural labourers—they all come about the same age. May I say now that this is my conclusion, as printed at the end of my paper: "My investigations appear to me to justify, as far as this country is concerned, the conclusion to which my practice in a large bottle-making district had previously inclined me—that though, as in other trades, there are men engaged in the bottle trade who undoubtedly do suffer from cataract, and who come under treatment for it, there is not sufficient evidence to show that they are liable to the affection to such an extent as has been asserted." That is just my position.

6286. Would you describe the eye conditions that you find result from carbon bi-sulphide?—As far as I remember the symptoms one got were those similar to

what one meets with in tobacco amblyopia and iodoform, and others classed under the name toxic amblyopias.

6287. What do you see when you look with the ophthalmoscope?—Some observers have noticed changes at the optic discs; others have not found anything markedly abnormal. The general symptoms resemble in some ways those met with in dinitro-benzol poisoning.

6288. And by the perimeter?—The area may be somewhat limited; as a rule, it is not very much. It is the central area that is affected.

Mr. E. S. REYNOLDS, M.D., called in and examined.

6292. (Chairman.) You are, I believe, physician to the Manchester Royal Infirmary?—Yes.

6293. And you have had under your care, during your experience, a very large number of working-class patients?—Yes, for the last 20 years.

6294. You are able to tell the Committee generally the kind of illnesses to which working people are specially exposed from their employments?—In so far as they come to hospitals.

6295. What specific trade diseases do you find most common?—Taking all together, I should say in all its forms lead poisoning.

6296. That, of course, is included in the Workmen's Compensation Act already?—That is already included in that Act. That is derived from so many sources. After that I should certainly put diseases arising from dust.

6297. Lung diseases?—Lung diseases from dust of all kinds, taking the dust now not as poisonous dust, but as dust causing mechanical irritation in the air passages.

6298. What forms of lung trouble should you say could be definitely diagnosed as being due to employment?—I should like to use the old-fashioned term "mechanical bronchitis"—that is an old term used by Walshe—because in most instances the irritation, in this district, shows itself as a bronchitis rather than what is called pneumonia—certainly one does see but very rarely fibroid pneumonia. In the majority of cases one would say it was bronchitis in the fine tubes.

6299. Do you find that form of bronchitis in persons not employed in processes in which dust is caused?—Yes, occasionally, but to show you how characteristic the condition is one has only to take a case which I saw yesterday in one of my beds for the first time since I sent this evidence. He was a boy who had got this fine tube bronchitis. I at once said to him "What do you work at?" because of the more or less characteristic signs, and it was a most likely thing that it was purely mechanical. He said he was a baker in an underground bakery, and had been for years.

6300. (Professor Allbutt.) What age was he?—I cannot say exactly, but I should say 24. He was an adult, and was working in one of the Jewish underground bakeries, and he was exposed to dust for long periods. By the way, might I just mention that he complained that the bronchitis was really due to the improved ventilation that he said had been insisted upon by the authorities, which he said caused draughts. The first question I ask always is, "What is your work?" because it is quite a characteristic thing. It will occur without dust.

6301. (Chairman.) Is it frequent without dust?—Yes, I should say it is frequent without dust, but it is so very characteristic when one hears of it that I always ask about dust. If a woman had come with this same condition, and I said "What is your work?" one might say "I am a charwoman." But very often they say "I am a rag picker or a rag sorter," and they work in extremely dusty occupations. You can tell from their hair when they come to see you. It occurs in people who work with emery wheels; it occurs in people who work in iron foundries with the black sand. Curiously enough, at present in one of my wards opposite the boy with bronchitis from flour is a man who has been ill for some years—I have known him for some time—who is now very bad, practically dying. He recently has been working with a dry emery wheel, and before that he worked in an iron foundry, where of course they use dry black sand, an extremely

6289. And the field of vision reduced?—It may be reduced somewhat, but not very much.

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6290. Is there recovery on leaving the work?—Yes. 7 Feb. 1907.

6291. What is the nature of the lesion then?—The poison must affect the nervous system, and affect specially the particular band going to the eye, what is called the macular portion. It is regarded as a retro-ocular neuritis. When I get the shorthand notes I will look it up and append anything I find. I am now only speaking from memory.

dusty occupation; and it does occur amongst iron-workers who work in the black sand in foundries. Another form in which you get it is in dye works. In some dyeing process, so I believe, they have to shake out the hanks of yarn—a certain amount of the pigment remains in these, and they are employed in shaking it out. A case occurred some years ago which I was investigating for the coroner where death had occurred. In that case it was chromate of lead—lead poisoning. In that case it was not so much the irritation of the dust as the actual poisonous quality of the dust.

6302. Do you find occasionally other forms of bronchitis among people who are employed in dusty occupations?—Yes; some slighter forms of bronchitis are due to dust, but not with these characteristic signs. Rarely one sees in bronchitis the distinct consolidation of both lungs, but it is not so common as bronchitis.

6303. What is the correct description of this form?—Pneumonokoniosis, which simply means pneumonia from dust.

6304. That is rather begging the question, is it not?—It is simply a name for the conditions existing, by which one means the inflammation of the lung induced by dust.

6305. Supposing you had those symptoms in a patient whose occupation you did not know, could you say it was that particular disease, or would you have to ascertain that he had been employed in a dusty occupation before diagnosing it as this disease?—Supposing I find the physical signs of pneumonokoniosis—that is to say, the consolidation of the lungs—I should ask the patient his occupation.

6306. But without asking the patient his occupation?—I think you will see my point. Supposing I ask the patient's occupation, and expecting to get the answer I anticipated I get a negative, I should be dissatisfied; I should cross-examine him with the idea that he had not given me a complete answer, that he had at some time been engaged in dust, and I should feel so certain of finding it that I should think probably the first answer that he had given me, that he had not worked in dust, was not correct, and that he had previously worked in it.

6307. It is almost impossible for these symptoms to be found, say, in an agricultural labourer or a carter?—Yes, pneumonokoniosis with the consolidation of both lungs—fibrosis of both lungs as it is called; but fine tube bronchitis might occur in anybody, a child, woman, or man.

6308. There are really two elements, fibrosis of the lungs and fine tube bronchitis?—Yes. I should say in this district the latter is far commoner.

6309. Fibrosis of the lungs is easily diagnosed as occurring from a dusty occupation?—Yes, that is the commonest cause.

6310. With regard to fine tube bronchitis, could you say there are any special symptoms which would prove that the person having it had been engaged in a dusty process?—No, I should not like to say so, not to prove it.

6311. Therefore if that disease were included under that name in the schedule to the Workmen's Compensation Act it might be possible for people to claim compensation who really had contracted the disease quite otherwise than from their employment?—Yes, I think so.

6312. Now supposing the burthen were thrown upon the worker to prove that the disease was contracted from the employment, do you think the worker would ever be able to prove that it was?—I think so, certainly. For instance, take the case of an emery wheel

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worker—a worker with a dry emery wheel. I think that a medical man would be quite justified in saying in the witness-box that the bronchitis had been caused by dust, taking it for granted that there was no previous history of such a thing. For instance, children have bronchitis, or have whooping cough, and certain of those children are always getting into this condition and going on for years. Supposing there were no history of previous ill-health, and a person is working with fine dust, like a fearfully irritating dust, and gradually contracts this mechanical bronchitis, I think his medical adviser would be justified in saying that that had caused it.

6313. Although perhaps in the next house to this man there was another with precisely the same symptoms who was, say, a carter?—Certainly, it has nothing to do with that.

6314. But there must be a certain percentage of emery wheel workers who would suffer from this fine tube bronchitis from causes other than their employment; if there is one in 1,000 of the population suffering from that, there would be one per 1,000 among the emery wheel workers?—I do not quite see how that would work out mathematically, because everybody is not an emery wheel worker. I should not like to say on the theory of probabilities that that is so.

6315. I do not say that the same percentage would hold; but supposing the average of the general population with this form of bronchitis were one case per 1,000 in a given period, while among emery wheel workers it was found to be three per 1,000—let us assume, therefore, that the prevalence of it is three times as great among emery wheel workers—of those three men per 1,000 one would hypothetically be suffering from this illness not on account of his occupation?—That is so; and if the percentage were only one to three I should say it would be very difficult for the emery wheel worker to prove his point; but I am sure the percentage is much more.

6316. Very much more?—Infinitely more.

6317. You have not any statistics?—There are no statistics of the ratio of cases of fine tube bronchitis to the population. It is impossible to say, but it is small—very small; whereas among the emery wheel workers and workers in dust it is relatively large. For instance, if you ask an emery wheel worker what happens to his fellows, he says they are all like this. Some come to the hospital, some do not. Some are much worse than others. He says it is a common thing. It is like boiler makers being deaf; they are nearly all deaf. Some of them go to hospital, some of them do not; but a very large number of workers in emery wheel dust get mechanical bronchitis. Stonemasons are another class you get.

6318. What symptoms differentiate this form of bronchitis from other forms of bronchitis?—Here, of course, one can only enter into medical details, which I can do quite easily. In percussing these cases to begin with, generally the lungs are quite resonant; there is no sign of consolidation. In mechanical bronchitis pure and simple, on listening there is marked obstruction in the fine bronchial tubes, accompanied by high-pitched whistling sounds, and sometimes with a few what we call fine bubbles, but obviously affection of the fine tubes. Another little point to a skilled ear—because, if I may say so, of course I have diagnosed for years amongst these out-patients—I think a skilled ear would also be able to surmise that there was a little consolidation of the lung as well around some of these fine tubes; that is to say, as a result of the irritation inside the fine tubes there was a little fibrous tissue thickening outside the fine tubes, because the sounds I have described are conveyed rather sharply to the ear, with a distinct suggestion that there was a little solid material more than usual conveying the sound there to the chest. That is in mechanical bronchitis only. Therefore I think to a skilled ear the sounds are rather characteristic. I gave you the baker as an instance. When I listened to the baker boy yesterday I turned round and asked him, "What is your work?" I had no idea what he was. He said, "I am a worker in an underground bakery." Those fine distinctions were there. With the other form, the pneumonokoniosis, in which there is consolidation of the lungs, in that case both lungs are more or less consolidated; you perceive it on percussion. If you percuss them you find they are very much condensed on both sides, very much like ordinary pneumonia, except that it is on

both sides; therefore it is a chronic illness, not acute pneumonia, and there one has a large quantity of fibrine tissue as a result. Such cases are not common, but they are well described. I admit that they are not common.

6319. What do you think the practitioner should look for if he is in doubt whether the case is one of mechanical bronchitis or of ordinary bronchitis?—In the ordinary bronchitis I think the ordinary practitioner would find it extremely difficult to find the ordinary fine tube bronchitis of some types over this fine tube bronchitis due to dust. I do not think it could be told. I would not be certain myself.

6320. You would have to know the history of the case in order to come to any conclusion whether it was due to dust or whether it was not?—That is so certainly; you would have at once to ask for the occupation. If the patient worked in dust the chances are infinitely in favour—enormously in favour—of it being a dust that has produced it, because without dust it is not a very common thing, after all, in the peculiar sense that I am thinking of. It is common enough in children, but I am talking of adults.

6321. What would be the correct name by which this bronchitis would be known—"mechanical," or what?—I should like to use the term "mechanical bronchitis," which is to my mind quite the best. It is a term used by Walshe, one of the authorities on lung affection.

6322. Supposing the ailment were scheduled officially under that name, would that be generally understood?—No, I do not think it would.

6323. Is there any other name that would be better understood?—I think you would have to give it a name which described it—that is to say, call it bronchitis directly due to irritation by dust particles.

6324. Is not that rather begging the question?—It is only a name for the condition, after all. I mean to say, if you were scheduling this, one would say lung disease due to dust—non-poisonous dust—irritating dust would do better. Some dust is not necessarily irritating. I would say due to irritating dust particles, shown either by bronchitis or what is called fibroid pneumonia. Then you get the two clinical conditions in. I do not think "mechanical bronchitis" would do, because people might quibble at it, and say that an injury to the chest setting up bronchitis was mechanical bronchitis, and that is not the thing one means.

6325. Silicosis and siderosis?—Those terms are subdivisions of pneumonokoniosis. There are plenty of sub-divisions; the commonest described is anthracosis, due to coal. That is the most written about, I should imagine. I suppose there are collieries underneath here, but I do not see much of it. It is very common. That is one form. Then siderosis is due to iron dust. Silicosis is a common form. That is stonemasons' phthisis, so called.

6326. Would those cases cover all the cases you have in mind of diseased lungs?—Pneumonokoniosis would cover most of them according to the general terminology. It would cover siderosis, silicosis, which are mere sub-divisions. There is another—byssinosis, from cotton dust. This is the biggest cotton centre in the world, yet I have never seen it—that is, consolidation of the lungs from cotton dust particles.

6327. (Dr. Legge.) Then pneumonokoniosis would be too wide a term?—No, I do not think so.

6328. But we might have cases in cotton workers attributed to this byssinosis, and claiming compensation for bronchitis which you have never seen. I should not say caused by pneumonokoniosis, because it is not due to dust.

6329. Would silicosis and siderosis cover mechanical bronchitis?—No; only those cases which are due either to dry silicon, stonemasons' disease, or to dust of iron.

6330. It would include any in which stone was an element?—Yes.

6331. Siderosis would cover iron and steel grinding?—Yes, it would cover those, but it would not cover anthracosis.

6332. I think you said anthracosis you had not seen?—I have seen very little of it.

6333. Again, one might get cases of bronchitis in

colliers, who would claim compensation for anthracosis?—Yes, that is quite possible.

6334. One wants to fine it down so as to cover cases in which the danger is recognised?—Yes, exactly. Of course, there you would at once get a dispute in the witness-box. You would get two sides. A collier might claim compensation; he would get his doctor to say his bronchitis was due to coal dust. It might be. It would be a very difficult thing to prove or disprove.

6335. (*Chairman.*) That is exactly the problem before this Committee—how far we should go in recommending inclusion of diseases in the schedule, with reference to which it would be almost impossible to get any decisive evidence in any given case?—I am afraid it is very difficult to get decisive evidence in medicine at all; we can only take probabilities.

6336. With regard to fine tube bronchitis, you are of opinion that if it were found in any person engaged in a dusty occupation, the overwhelming probability is that he would not be suffering from it unless he had been engaged in that occupation?—In the type I am thinking of, yes. I should be quite prepared in either of the two cases—which are at present in my wards, as it happens, especially in the emery-wheel worker who was previously in an iron foundry—if he claimed compensation I should be quite prepared to at once go and give evidence, strong evidence, in his favour.

6337. Although you might find precisely the same symptoms in a person who had not been engaged in that occupation?—Yes, I think so. The probability in his case is enormously in favour of it being dust which has produced it.

6338-9. Are there any other lung diseases of which the same thing might be said besides those which we have mentioned?—That they were due to dust?

6340. Yes?—I do not think so. I think you can only say that in mechanical bronchitis, which you have described, you do not get the dullness of percussion; you do not get the marked fibrosis that you do in the other type which is more of the chronic pneumonia type. I do not know of any others.

6341-2. (*Professor Allbutt.*) I have a few questions to put to you. In the first place, we can safely exclude all children, cannot we?—Yes.

6343. I suppose that as a matter of practice no case is likely to come up under the age of 20?—No, I do not think so.

6344. That clears the ground very largely. You have no recollection of any case of koniosis under 20 years of age?—I have seen one boy of 18 who came with mechanical bronchitis, his face covered with emery dust when he came to see me; he was under 20. That is the only one I can remember.

6345. Well, we will put it at 18, but, at any rate, this clears the children out?—Yes.

6346-7. Moreover, we may cut out all acute and toxic cases?—Yes, certainly, from this type.

6348. When you have then excluded all children and all acute cases and toxic cases, such as influenza, the remnant of fine tube bronchitis cases left apart from koniosis is very slight?—Very slight.

6349. This seems to be one very important point gained. Although you say fine tube bronchitis is in a sense fairly common, yet most of it falls under the head of children, and much again under toxic causes of various kinds; so that in adults chronic fine tube bronchitis is a rare affection?—Distinctly rare. That is what I meant, of course, when I was pointing out the question of possibility and probability.

6350-2. You think both flour and coal dust must be included among the mechanical irritants?—Yes, I think so.

6353. Although we are told that pulmonary affections in miners are a little under the average, owing, perhaps, to the equable temperature in which they work?—Yes, but I think you ought to include the possibility of coal dust; although the anthracosis cases are very rare. I have seen them, but only very rarely.

6354-5. (*Chairman.*) You think we ought to include flour and coal dust?—Yes, certainly.

6356. (*Professor Allbutt.*) This fine tube bronchitis due to dust goes on, or may go on, to a patchy pneumonia?—That is so.

6357. If that becomes extensive it is a fibroid pneumonia?—It is fibroid pneumonia.

6358-9. The bronchitis of dust is then a preliminary stage of fibroid pneumonia?—Yes.

6360. Do you find, as a matter of pathology, that it does not always go forward to fibroid pneumonia in a marked degree?—It may. It is an important thing from the question of compensation. It not infrequently goes on to a dilated heart and death without the pneumonia form.

6361. Then again dilatation of the bronchial tubes comes on, does not it?—Yes, it may come in, but quite in the latter stages.

6362-3. It is not an essential part of it?—No, I do not think it is essential.

6364. My recent experience on this Committee would dispose me to agree with you about this?—I do not think it is essential.

6365-6. To take up the very important difficulties which were raised by our chairman. Of course, in no instance can we expect to come to a definite conclusion unless we have all the necessary information, but considering that these cases, with the exclusions we have made, and apart from dust, are very rare, and presuming you to have, which I suppose you would have together with this, certain physical signs and symptoms, you would, if acting as referee, be able to come to a decision in individual cases with a very high degree of probability?—I think so, if you get reliable medical evidence.

6367. Then I will go a little further still. Supposing, for example, that you are told of a good deal of breathlessness and cough, and you note some defective aeration of the blood, and supposing these symptoms to be out of all proportion to the physical signs obvious to an ordinary medical man (I am speaking of you as a medical man specially skilled herein), would there not be a strong presumption in favour of dust? We have been told that usually symptoms precede obvious physical signs—that a man gets short of breath, bluish about the lips, and coughs?—I think that is very likely, but there, of course, one has to be very careful, because if you depend upon those only you must be quite certain that you are not dealing with congenital heart disease.

6368-9. You mean there might be some obscure heart disease?—Yes, for which, of course, the dust would not be responsible.

6370. Now, the next point of great importance is the relation of all this to tuberculosis. In a substantial number of these cases, especially of long continuance, tuberculosis is found in the sputum?—Yes.

6371. As a secondary condition?—Yes, purely as a secondary condition. I think that is also, if my memory serves me aright, rather curious. Dr. Hilton Fagge, in his text-book, says all such cases are tubercular. Another authority says none of the cases are tubercular, Dr. Hilton Fagge looking at them from a post-mortem standpoint, the other from the physical aspect. In the earlier stages they are not tubercular, but in some cases they get infected later on.

6372. A certain ultimate accession of tuberculosis does not, as we are informed, gravely modify the course of the disease?—I should not think so.

6373. So far, I think, the way seems fairly clear. Now we come to another problem. Let us take, for instance, a young man who is in a dusty occupation, he has not been in it very many years—a comparatively short time. He feels ill, and presents the ordinary signs of pulmonary tuberculosis. We should be quite clear that a case of this kind could not be put down to the occupation. This I take as one extreme—that we have a case of ordinary consumption starting in any man, whatever his occupation may be. We should find it fairly easy to put this extreme out of court; but may there not be a considerable group of cases between this extreme and that of fibroid phthisis, cases in which it might be alleged that the dust had been so far a contributory cause of the tuberculosis that the tuberculosis must be put down more or less to the occupation in which he is engaged?—There again comes the question of probability. I should say no, because it is much more common to get tuberculosis without dust than to get it as a result of primary dust cause—I should say so, amongst industrial people—the industrial population, pure and simple.

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6374. Still, supposing the argument to be raised in court in a particular case? Here is a man with a perfectly healthy history; he goes into this dusty employment; he is in it ten years; he then starts chronic tuberculosis, with characteristic physical signs, and it is alleged that this is a fairly direct result of the irritation of the dust. Such cases might be many?—That is one of the enormous difficulties that would be raised constantly. I think my own feeling would be that they would first of all have to prove not a small number of years of true dust mechanical bronchitis. One has examined so many of these cases, and examined the sputum in so many of them, and found no tubercle, whereas in later stages one has found tubercle. So many go on for years without tuberculosis. I think before you can establish that tuberculosis was primarily or secondarily due to the dust you would first of all have to have a history of ill-health for some time arising from the dust.

6375. That is the ground upon which an expert referee would proceed?—I think so.

6376. Now about alcohol. It is alleged that persons employed in dusty occupations become more thirsty than others: at any rate they drink more?—That is a point I still wanted to mention. I did not know it had been already alleged. It is a point upon which I can give you direct evidence. There is not the slightest doubt about it. Take the emery wheel worker who is now in the wards of the Royal Infirmary. He has not only got all the symptoms of dust and dilated heart, but has cirrhotic liver. He tells you candidly his is a dusty job, and he drinks a lot. A large number of dust workers drink very considerable quantities of alcohol as due to a thirsty job, and I am sure that the man I am thinking of now, who looks probably as if he might die, would not be in the condition he is or be as bad as he is if it were not for alcohol. He has a tremendously dilated heart, a large amount of which is due to alcohol. A considerable amount of dust—I find bronchitis and a dilated heart consequent upon that, but a large amount of it is due to alcohol. The alcohol comes in in a large part of the cases.

6377. On the other hand, you have no knowledge of this kind of bronchitis produced by alcohol in persons engaged in occupations which are not dusty?—No.

6378. As regards the effect of this upon the heart and circulation, I think we quite agree—at least your evidence is in accord with what we know. I do not suppose that there is anything particular to ask you about that. It would have the same effect on the heart and circulation as in ordinary emphysema?—It is the same thing.

6379. Is emphysema at all a part of this mechanical bronchitis?—Yes, they get barrel-shaped, just as this boy baker, who is just starting with it. It is a condition in which the lungs get over-dilated with air.

6380. (Dr. Legge.) Apart from the condition of the lung itself in this mechanical bronchitis, is there any other lesion of the respiratory tract that you observed?—No, not that you could put down to the dust.

6381. I was thinking there might be some ulceration about the margin of the nose, chronic rhinitis?—I have not seen that.

6382. No perforation of the septum?—No, I have never seen such a case.

6383. I should like to get some idea of the duration of the incapacity caused by the mechanical bronchitis. In the first place, do they get acute attacks of bronchitis which lay them up?—They get exacerbations; they get increases which may lay them up and render them unfit for work; for instance, if they get a little cold it is worse than with an ordinary person; they lie up and go off work.

6384. (Chairman.) Would it be called fine tube bronchitis if they were incapacitated in that way?—Yes, I think so. It would be fine tube bronchitis made worse by the ordinary congestion one gets during bronchitis.

6385. (Dr. Legge.) In the course of years the exacerbations get more and more severe, and you get this dilated condition of the heart, and they become subjects of chronic bronchitis?—Yes, and become absolutely incapacitated. I always tell those people immediately I diagnose to immediately leave their occupa-

tions; it does not matter what they do provided it is not in dust. It is undoubtedly a fatal thing in the end if they go on.

6386. That may incapacitate them for five or ten years?—Or over—all their lives.

6387. I was anxious to get an idea of how long they live after this permanently incapacitated condition?—It is difficult for me to say. Of course, there are statistics available of the duration of life in stonemasons and also of the duration of life of the grinders of Sheffield. I cannot give you them at present. I think the dry grinders of Sheffield have a life of something like 30—that is the duration of life.

6388. That is the fibrosis condition?—Yes, I know, but still it is the average duration of life of the grinders of Sheffield; it is very low. The stonemasons again are not long lived. In these cases it is very difficult to say how long they will last, I am afraid.

6389. (Professor Albutt.) They are used to having a cough, and it is some time before they seek medical advice?—Yes.

6390. Very often they go five or ten years before asking for advice?—Yes, they are used to it. They have it, are used to their occupation, do their work, and do not complain, and all the time they are suffering, until they get an exacerbation, and then they come to the hospital.

6391. (Dr. Legge.) You do not seem to draw a distinction between the two conditions?—So far as the symptoms I do.

6392. But you group the stonemasons and the grinders of Sheffield, whom one regards as definite cases of fibrosis of the lungs?—I should group them all (quite apart from the physical signs) as dust diseases, and as disabling diseases. I should group them together.

6393. Do you not think that the cases of fibrosis of the lungs are much shorter in duration, that death results much sooner in the Sheffield grinder than in the baker, we will say?—Certainly, there is no doubt the silicon particles or the iron particles are much more irritating. With an emery wheel worker it is an intensely irritating dust.

6394. That would be silica?—Corundum is one form of silica, I suppose. I do not know geologically.

6395. Under the microscope would flour dust appear to have irritating properties?—No, not under the microscope. Starch granules would not look irritating particularly.

6396. And could easily be coughed up?—Yes, it could easily be coughed up, too.

6397. It would not remain in the bronchial tubes and set up an irritation?—No, I do not think so, except one must remember that a cough itself irritates and congests the bronchial tubes.

6398. In flour mills I grant that there is an injurious dust, but that would be from the husk?—Yes, that is so.

6399. Which would be a siliceous dust?—Yes.

6400. But from the pure starch you think that must be regarded as a mechanical irritant to the lungs?—There I am in a difficulty, because I never traced these bakehouse cases. I have seen a few, quite enough to make an impression upon my mind. They may have been working with some of the wholemeal flour, and that I cannot tell you. Whether pure white meal, white flour, will produce mechanical irritation, or whether the dust only found in those who work so-called wholemeal flour I cannot tell you.

6401. You do not know whether in working that pure wholemeal flour you get this particular condition of fine tube bronchitis?—No, I could not tell you. Undoubtedly you would be more liable to get it with wholemeal flour, because undoubtedly they are sharper particles.

6402. If that is so, you would be able to narrow down your pneumonokoniosis rather so as to exclude certain forms of dust?—Yes, if it were the fact, if one could show that certain dusts were not mechanically irritating; that of course would be very difficult to prove. I do not know anybody who has direct evidence on the question. I do not know whether the thing has been worked at.

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6403. It is a point that could be ascertained experimentally, is not it?—I suppose it might be.

6404. Would you think, then, we can regard pneumokoniosis as silicosis and siderosis?—And anthracosis.

6405. Although it is recognised as not being a cause of phthisis?—Yes.

6406. You see, where in a collier it is caused by the stone dust, naturally on his working that would come under the heading of silicosis?—Yes, that is so. I think the records are such that you must include amongst the fibrosis of the lungs fibrosis produced by coal dust.

6407. In that case it would be due to the silica in the coal?—That is rather difficult to prove, because those lungs are absolutely black. I have seen specimens of them. It would be very difficult to prove it was the stone.

6408. If limited to that extent it must include the fine tube bronchitis?—Yes, that is so, I think.

6409. Do you think that fine tube bronchitis is always the prelude to any fibrosis of the lungs?—I am inclined to think it probably is. It seems to me a difficult thing for a mechanical irritant, taken in by the air passages, to cause an inflammation of the tissue outside the bronchials, and not to cause some bronchitis. That is why I prefer the term "mechanical bronchitis." Those are the first symptoms, I think, and that may go on for years before you get the fibrosis.

6410. (Professor Allbutt.) There are one or two questions I want to ask you that I omitted. You have told us about the variable rate of progress under different kinds of dust. Do you think that personal susceptibility is an important factor?—I think so, most certainly. I cannot prove it, but I think it is very likely that personal susceptibility is a very strong factor as to whether you get merely mechanical bronchitis or whether you get fibrosis as well. Certain persons are much more prone to form fibroid tissue than others. Some people get a scar which is a mere nothing; another person who has an injury gets a scar that is an enormous mass.

6411. As regards bronchial irritation, that would be much on a par?—That would be much on a par. I think as regards fibrosis personal susceptibility is a great element.

6412. Another point I omitted was about febrile temperatures. We have heard in evidence of this important criterion that when a workman is ill with chronic pulmonary disease due to dust, his temperatures remain normal?—That is so.

6413. Even although in a later stage tubercle may appear in the sputum?—That I could not say.

6414. Without entering upon debatable ground, among the other elements in forming a diagnosis a normal temperature would be an important one?—Certainly.

6415. Would the cramped position of a grinder holding his metal against a wheel tend so far to muscular fixture of the chest that he would be less and less able to draw a deep inspiration?—I should not like to say.

6416. You have not become aware, on examining cases you have seen, that such a fixed attitude of the chest has come about, apart from emphysema?—Not apart from emphysema.

6417. (Chairman.) I have a few supplementary questions to put to you. I understood you to say, in answer to Professor Clifford Allbutt, that in cases of fine tube bronchitis you would exclude acute cases from your consideration as not being due to the employment?—Yes, I think so.

6418. Why is that?—Because if you do include them you will at once have enormous difficulty, because acute fine tube bronchitis is quite common—you have whooping cough even in adults. I saw a case yesterday in a lady nursing her children. She had whooping cough and fine tube bronchitis. It occurs in influenza and other diseases.

6419. Cannot those workers get their fine tube bronchitis from their employment?—They might do, but I do not think they ought to have compensation until they have got chronic fine tube bronchitis.

6420. Cannot chronic fine tube bronchitis develop an acute phase?—Yes, certainly; that one would call an

exacerbation, not a chronic one; they would then perhaps go to hospital; they would then perhaps be disabled, and possibly then might begin to claim compensation; but they should only have it, in my opinion, if there was a long history of previously fine tube bronchitis.

6421. (Professor Allbutt.) There is a certain technical difference between the terms chronic and acute?—Yes.

6422. (Chairman.) Fine tube bronchitis due to employment would not begin with an acute attack?—It might do. What I mean is this. A person goes into a dusty works, and within a week develops acute bronchitis. That might be due to dust, but it would be a very difficult thing to prove, but I certainly would not think he should have compensation for that. It is his own risk, as it were. You might say, "Yes, we will give it to him." I should think that those cases only ought to apply in which the occupation for a long period has produced the effect. Ammonia fumes, acid fumes will produce acute bronchitis due to occupation, of course—that is irritation which you have not so far mentioned, and which I forgot.

6423. I will ask you about that later?—They will produce an acute bronchitis, so acute that it will kill a man within a few days. I have known several cases of that.

6424. In the dusty occupations you do not think that any injustice would be done if cases which began with an acute attack were to be excluded from compensation?—But how long is the attack to have lasted? If you say it began with an acute attack, and then compensation is claimed five years afterwards—you cannot word it that way.

6425. I mean no compensation should be given during the period of that acute attack?—Yes, I think so, if the acute attack were an exacerbation of a chronic form.

6426. I understood you, in answer to Professor Clifford Allbutt's questions, to say that we should be able to limit the forms of bronchitis for which compensation should be payable—that you would exclude all bronchitis among children?—Yes, and those very toxic things, influenza and whooping cough.

6427. You would also exclude bronchitis if it took an acute form. The difficulty in my mind is this: if you do that may you not be excluding cases of bronchitis which are clearly due to occupation?—You might; but there, of course, everything would depend on the history of the case. If a man with acute bronchitis claimed compensation, I think that he should at the same time be able to prove that he had suffered for some period from a chronic form.

6428. You would not bar out acute bronchitis?—No.

6429. Should you say that a man who was taking alcohol in considerable quantities would be more likely to suffer from bronchitis than his neighbour in the workshop who did not take alcohol?—Undoubtedly.

6430. He would?—Undoubtedly. I say that without the slightest hesitation.

6431. If he suffered from bronchitis it might be more severe?—Certainly, it would be.

6432. Apart from symptoms clearly due to alcohol, the bronchitis symptoms themselves may be increased by alcoholism?—Certainly.

6433. Do you think that alcoholism itself might be considered at all a trade disease in these occupations on account of the dust?—No, I do not think so, because of course there are perfectly well known safe methods which, by-the-by, I think employers ought to provide for these dusty occupations. They ought to provide an innocuous drink for their workpeople. That is my feeling.

6434. If that were done, probably, if they had to compensate for these bronchial troubles, they would have less compensation to pay?—I certainly think so. It has been done with haymakers and others. I think it is done sometimes by Corporations for gasworkers.

6435. Have you had many cases under your observation of men suffering from one or other of these troubles who were coal-miners?—No, very few—comparatively few.

6436. You have had some?—I have had some who were coal-miners. There, of course, you would get more evidence probably from the Wigan district or from Haydock, though we have mines here.

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6437. You are clearly of opinion that there are lung troubles caused by coal mining?—I should not like to say "No," but I do not think they are as common as the text books think.

6438. Would you say to the Committee that you are clearly of opinion that they are so caused by occupation, or would you rather suspend your judgment upon that?—I would rather, if I may, refer you to the Wigan district, where you can get the evidence of the men, and where the industry is much more concentrated than here. You might get mechanical bronchitis in a miner due to another cause. In Wigan you are likely to get the concentrated evidence.

6439. Cases that are caused by flour dust—have you had many of them?—No, not many. I could not say how many in 20 years—I am afraid it would be impossible—but enough to make an impression for me to know of my own knowledge without books that it is a condition.

6440. Are you of opinion that these bronchial and lung troubles come from the occupation of rag-sorting?—Yes, I have seen women and girls who were rag-sorters.

6441. Are there any other dusty occupations other than those which have been mentioned from which these maladies arise?—There is another—I have seen cases of it—people handling calico that has been stiffened or dressed with china clay. I have known those cases. Those are not common, but I have seen a case, and possibly more than one. I can recall the case. I have not a very good recollection of it, but I know of such a case, in a patient working where there has been china clay.

6442. Can silicosis or siderosis of the lungs ever occur without dust as a cause?—No.

6443. The symptoms are to be clearly differentiated as being due to dust?—Yes, I should say so if it is of the pneumonic type—if it is of the solid lung type—the fibrosis of the lung type.

6444. Are there cases in which it would be impossible to tell whether the symptoms were those of siderosis or silicosis, or, on the other hand, due to some completely different cause?—If they were fine tube bronchitis I do not think you could absolutely prove it. That was the question we discussed as regards probabilities. If it is of the pneumonic type—the fibrosis of the lung type—I am rather inclined to say you could fairly certainly say it was dust essentially. If it is mechanical bronchitis the probability is that it is due to the dust, but it is not an absolute certainty.

6445. You were saying that mechanical bronchitis is sometimes caused by fumes?—Yes, by chemical fumes. You can get it from various chemical fumes acting as an irritant, in which the fume is not poison itself like the fumes of prussic acid would be; for instance, ammonia, nitric acid fumes, those are two; hydrochloric acid fumes again will do it.

6446. Would there be any specific symptoms with the bronchitis which would connect it with the fumes?—Sometimes in very acute bronchitis you get laryngitis at the same time—irritation of the larynx and fauces. In this case it is not a question of chronic, it is very acute mischief, which may kill.

6447. If you saw a man with those symptoms would you be able to say from the symptoms themselves that he had been subjected to those fumes, or would you require to know the history of the case?—You would have to know the history of the case, certainly.

6448. Would there be any risk, if you did know the history of the case, of confusing symptoms so caused with bronchitis caused in other ways?—No, I do not think so, if you knew the history. They are very acute affections.

6449. It would be pretty certain that they were due to the fumes and not to ordinary bronchitis?—Yes.

6450. (Dr. Legge.) Need we consider the acute bronchitis arising from ammonia fumes and nitric acid fumes? Is not it in the nature of an accident?—It is in the nature of an accident as much as if he had been holding a piece of hot iron and dropped it on his foot.

6451. (Chairman.) With regard to carbon bisulphide poisoning, you have had some cases of that under your observation?—Yes.

6452. Have you had any cases in recent years?—

I cannot recall any case for many years now at all. One of the first, if not the first case, I should think, came under my notice when I was resident at Cheadle Asylum in 1884. He was a gentleman, so I have been told since, who more or less introduced this carbon bisulphide process into this district, and he became insane. Several others of his workers became insane after that; one was when I was resident at the Royal Infirmary, and saw the medical "urgencies" brought in; that was in 1887 to 1890. Occasional cases would be brought in that had sudden attacks of acute mania while working in the gas. Then one used to get subacute or more or less chronic cases in which they had slight insane attacks and peripheral neuritis, tingling in the fingers, loss of power of the limbs, and so on. Since that time in the seven years ending last year in the out-patients in the infirmary I could hardly recall any case that I can put down to carbon bisulphide. The symptoms were so grave and dangerous that at last nobody could be got to work in that gas, and they were made to guard against the ill-effects by a fan or ventilator, or it was boxed in, or something so that the workers were protected, and now one sees practically nothing of it. I have not seen anything of the kind for a long time.

6453. You have not heard of anything?—I have not heard of anything. There is one thing that comes in here—naphtha. I may take that at the same time. Here one has seen anæmic girls, pale, wretched, half-fed people who come and say that they are working in naphtha fumes; and they half allege at any rate that it is the naphtha fumes that cause their conditions; but as far as I know I cannot say I have ever seen a single symptom which could be put down to naphtha which could not be explained by anæmia or half-feeding. Two or three days ago a private patient came to my rooms who was complaining of neurasthenia. He worked in india-rubber works to a large extent for years, and I took the opportunity of asking him a few questions (without letting him know what I wanted particularly) about carbon bisulphide, and seeing I was interested in it because I used to see cases, he said, "It is all gone now." He was not a master; he was a worker; he had no personal interest. He said, "The carbon bisulphide is all gone years ago; they never get it now." I said, "Do not you have naphtha about?" He says, "That does not do anybody any harm; I have never had any complaints, and I have worked for years amongst these fumes. You see men standing over the fumes all day long. I never hear any complaints about naphtha fumes." That was quite an unbiassed statement that I got for the purpose of this Committee without letting him know what I wanted. That was only two days since. My own view is, as far as I have seen, I have seen no symptoms you can put down to naphtha directly—anæmia, yes.

6454. (Professor Allbutt.) You have had no unquestionable case?—No; you could easily have put down the symptoms to something else.

6455. (Dr. Legge.) It has been asserted that epilepsy may be caused by naphtha—that they get intoxicated?—I very much doubt that. They get intoxicated with carbon bisulphide most fearfully, and have attacks simulating epilepsy. I have never seen it from naphtha. They used to go off after a few minutes. They could only work for a few minutes in the old days of the carbon bisulphide system. They used to come out raving mad, and try to climb up the walls of the building, after two or three minutes' work. After a time it passed off, and they became, as a rule, depressed. Some of them used to like to go back to their work, because slight quantities of carbon bisulphide exhilarated them, and they lost their melancholia. But if they had too much they got acute mania. From naphtha I never heard of it at all, and certainly have never seen it here.

6456. (Chairman.) Are there any other illnesses that occur among workers in india-rubber works due to their employment?—I do not know of any in india-rubber works; I cannot recall any at the present time at all.

6457. Have you had some cases of poisoning by carbon monoxide?—That, again, is a very rare affection. There are no very definite symptoms. I have seen acute cases, of course, from coal-gas poisoning, but that is another matter. In workers it is very uncommon. You get a certain amount of anæmia and general ill-health, with just a little tingling of the

ingers, but nothing to prove that it is carbon monoxide.

6458. You have seen some cases of poisoning by di-nitro-benzol?—Yes, those I have seen. I have seen a case in the old days. There is a big anilin works not far from the infirmary—some two or three miles off. I have seen one or two cases when I was resident medical officer. An acute case there is no difficulty in diagnosing.

6459. Were they cases of sudden poisoning?—Yes.

6460-1. You do not find a gradual poisoning case?—They are uncommon. Recently I had three sent to me—within the last fortnight, curiously enough. One was a man. You could see there was something out of the ordinary with him. His lips were distinctly bluish, and he was pale. He had a certain amount of numbness in the hands, a certain loss of power—nothing very definite. You could not tell what was the matter, but it was something unusual. When questioned, you found that he had been working in di-nitro-benzol. Going into his history, you found there had been changes in the urine as well. In that case the doctor wrote me a very good account of it. I did not see the changes of urine myself, but he had seen them.

6462. Are you talking now of di-nitro-benzol or of

anilin?—I think it was the di-nitro-benzol fumes, not the anilin pure and simple.

6463. Have you any idea what was the man's name, because we might trace him?—I have it at the infirmary. Then there were two boys who also came that were alleged to have this. One I think had a little of it. In one boy there was a doubt whether he had not also lead poisoning; the other boy had undoubtedly lead poisoning. Of those three cases, one was a lead case, the other was di-nitro-benzol as well. I will not say absolutely it was not anilin. The symptoms are not unlike. They cause some blueness. The other was, as I have said, a mixture. This boy had been working at picrate of lead, and there were in the rooms also some fumes of di-nitro-benzol.

6464. Were they incapacitated for more than a week in those cases?—Yes; it takes some time for the blood to get into better condition again—probably three months.

6465. Have you had any fatal case of di-nitro-benzol or anilin poisoning?—No; the worst case I ever saw was when I was resident medical officer, about 1890, and he got all right. I wrote a paper about it at the time.

6466. You have no other matters to suggest for the consideration of the Committee?—I think not.

Professor R. J. HARVEY GIBSON, M.A., called in and examined.

6467. (Chairman.) I think you are Professor of Botany at the University of Liverpool?—I am.

6468. And have you made an investigation into the cause of the alleged poisoning by African boxwood?—Yes. I ought to explain to you, Sir, at once that I was asked questions on this subject in 1905, just a few weeks before I left for South Africa; so that naturally the research did not aim at being thorough and complete. I left immediately after that, and knew nothing of what had happened for three months. I do not profess to say it is exhaustive.

6469. You have not made any further investigation?—No; no other questions were put to me after the action of the Factory Department.

6470. What kinds of wood are the cause of this poisoning?—There are several woods that are called African boxwood. There is first of all the one which is best known as East London or South African boxwood. I do not know whether you want the scientific names of the plants as well.

6471. We had better have them, I think?—There is the East London or South African boxwood, *Gonioma Kamassi*, Apocynaceæ. That belongs to a very poisonous order—the English periwinkle order. There is another, which is known as West Indian boxwood. I do not think that comes under the purview of this case at all, because it is not in dispute. I found that the South African boxwood was also called by the workmen West African boxwood, and a piece of West African boxwood was also sent to me.

6472. Is there any other botanical name for West Indian boxwood?—Undoubtedly; the name of the West Indian is *Tabebuia pentaphylla*. I think, as there seems to be a little confusion, I had better go through them again. There is first of all East London boxwood; there is also South African boxwood. Those two are the same—i.e., *Gonioma Kamassi*. They belong to the order Apocynaceæ. Then there is West Indian boxwood, which is another plant altogether. That belongs to another order, Bignoniaceæ. Then there is the West African boxwood, also called yellow Congo mahogany. That is a wood I had great trouble with, but succeeded in finding it came from a plant called *Sarcocephalus Diderrichii*. That also belongs not exactly to a poisonous order, but to one which has many alkaloids—coffee, cinchona, whence quinine, and so on—the order Rubiaceæ. So I had to find out first of all which of those various woods it was. I found that all of them were used for shuttle-making. I found that the men did not know one from the other, or, at all events, they confused them; and the first piece of wood that they sent me was the last mentioned, genuine West African boxwood. I worked through that, but could not get a sufficient quantity

to make any satisfactory chemical analysis. I then demanded from the Secretary of the Shuttle-makers' Association a quantity of the sawdust. A sackful of it was sent to me. When I got this material I was a little suspicious. It had not all the characters of the small quantity of the *Sarcocephalus*, the West African boxwood I possessed before. I then sent to them for more wood. This was after I had seen Dr. Legge, to whom I have told these details. Then they sent me the East London or South African boxwood as the wood that was causing the trouble, so that I had been working to start with on the West African, and had suddenly to shift to the South African or East London wood, and the East London wood was the one with which all these chemical and physiological experiments were made. In the journal in which this paper was published, the "Bio-Chemical Journal," Vol. I., No. 1, of January, 1906, there are references, and there is an extra page, which you have there gummed in, pointing out how the men had unwittingly misled me as to the source of the sawdust which they sent me for analysis. They sent me the wood of one thing and the sawdust of another. They were not to know the difference. I had no notion that all these different woods were called boxwood. None of them belonged to the genus *Buxus*, the genuine Persian boxwood, which, so far as I know, is not dangerous at all.

6473. What was the result of your investigation?—After finding out that the sawdust pointed to its being this South African boxwood, which was a well-known plant, I then proceeded, with the assistance of two of my colleagues, to check my work. One was Dr. Titherley, lecturer on organic chemistry. I proceeded, with his assistance, to look for an alkaloid. I went on the assumption that there was an alkaloid, and went through a somewhat elaborate process to get a quantity of alkaloid out of it, which process is detailed in this paper. Roughly speaking, I think I may say we found that the wood contained about 0.1 per cent. of alkaloid. It agreed in all respects in its characters—such characters as the men could possibly distinguish—with the effects that they said the wood had upon them. Dr. Titherley checked the process with me. I say that it agreed in all respects in its characters that the men could distinguish—that is to say, it had the same smell: it was apparent that it had a penetrating odour impossible to conceal. It turned out a brownish, amorphous, glassy solid when extracted. I say in this paper that after distillation a thick, dark brown syrup remained over, consisting of the free alkaloid, which, on cooling, solidified into an amorphous, brittle glassy solid. When burnt it gives off a most penetrating odour with a distinct reminiscence of Turkey rhubarb, which the men said was the scent that they perceived from men who were suffering from the disease supposed to be caused by it. The men said to me, and I think they said to Dr. Legge as well, that the patients exhibited a pale yellowish or greenish

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colour on the face and body, accompanied by a peculiar "camphor" or "Turkey rhubarb" odour from the breath and skin. Then, as I am not a medical man, and, further, as I have no right to perform such experiments, I asked my colleague, Professor Sherrington, to go through for me some experiments on the live heart, because one of the characteristic symptoms of the disease in the men was said to be cardiac weakness; and solutions were made of this substance—we had not very much of it then, only 0.7 gr. Solutions were made not only in alcohol, but also in a standard solution (Ringer's Saline it is called), and the net effect of the experiments I will now describe. I need hardly say we had control experiments as well—that is to say, we tested the hearts with alcohol alone, and also with saline alone before the drug was put in. Professor Sherrington and his assistant, Miss Sowton, carried out the experiments for me in the Physiological laboratory, and we came to the conclusion distinctly that it was a cardiac poison inducing a gradually slowing heart beat, a diminution of vigour of the contractile tissue of the heart. We thought also that its effect was cumulative. A succession of small doses had a cumulative effect, and finally, after long exposure, caused cessation of the beat altogether. Further, we noticed the extreme solubility of this alkaloid in salt solution. The pulse tracings are here. It indicates at once, as for instance here (*indicating on chart*), that a very small dose is added. There is the place of entry, and the slow return is shown. Similarly with a large and longer dose from there to there (*indicating*) with the other solution. This is the alcoholic solution, the other is the saline solution. The same results are produced. I had two or three dozen of these tracings, of which those are samples.

6474. Were those experiments made on the hearts of living animals?—Those were made on the hearts of animals just killed, the hearts taken out and kept alive under oxygen pressure—hearts of cats; also I think, if I remember rightly, they were made on the rabbit; and we had also experimental work by hypodermic injection on live rabbits. (Professor Sherrington has a vivisection licence.) They were put under chloroform and an alkaline solution was injected with the same results.

6475. (*Professor Allbutt.*) The artery being connected with a manometer?—Yes. We felt it was more to the purpose to get a higher mammal, to take a larger heart, take it outside and do it on the same lines as the experiments being conducted at that time in the Physiological Laboratory for the Chloroform Commission, and all the apparatus was ready for the particular experiments they were concerned in. I found it extremely useful to have the use of their apparatus, and let them do the experiment straight away. The net effect was that we found that this alkaloid was very soluble in saline. We knew that perspiration contains relatively a large percentage of saline, and I had heard from the men themselves—or rather from their representative, the secretary of their association—that the men worked semi-naked down to the waist; that it was very hard work, that they were constantly perspiring, and found the dust from the work all over their bodies. I suppose these men did not rub themselves down. I conclude that the perspiration being reabsorbed would leave on the surface of the skin a certain percentage of the alkaloid; that might be slowly absorbed by the circulatory system and so transferred to the heart itself. That is practically, in a few sentences, what my work is. The rest of the paper deals with the details of the subject, and also with the statements of the men, accompanied by a detailed report which is made by Dr. Hamilton Stewart, of Thornton, who apparently had come across this in Yorkshire without previous knowledge of what the cause was, and he admits himself puzzled at first. In his own words he says, "When I first saw him during a severe attack I was quite at a loss to account for his symptoms."

6476. (*Chairman.*) Did you make any investigation to see whether this poison would be likely to have any effects other than the effect upon the heart?—On some other organ, you mean?

6477. Yes?—No; it was simply because of the repeated statements that the heart was affected, and the fact that on the two occasions, at all events, of death which I was told had occurred presumably from the effects of this poison, that in both of those cases it was put down to cardiac incompetence, to cardiac asthma—it was that made us think of the heart to start with. I am not a medical man, and can only speak at second hand on this point.

6478. You have not yourself examined any of the persons suffering from this?—No, I have not.

6479. How would you describe these woods generally, supposing it were intended to schedule their poisons as subjects for compensation?—Do you mean in general appearance?

6480. No, in terms. What term would you use to describe these woods?—Do you mean so that anyone would diagnose the woods?

6481. I will put it in this way. Our business is to advise what additions shall be made to the schedule of the Workmen's Compensation Act. Supposing we wish to include this disease which comes from working with certain woods, how are we to name the woods from working with which the disease arises?—I understand you now. I suppose it would be best known to the trade as Knysna wood being shipped from a port of that name, not very far from Port Elizabeth. That is the port from which it is most commonly shipped; but it is shipped from East London also; but there, of course, again one is face to face with a difficulty; that throughout these woods get popular or semi-popular names, and things are called mahogany—I know fourteen different kinds of wood called mahogany, not one of which is mahogany—the result is that we get popular names special to one part of the country; and it is quite possible that this wood is known as West African boxwood in Lancashire, and known as South African boxwood in Yorkshire. There is endless difficulty with the names of these woods. I think I may say, roughly, it is most commonly known as Knysna boxwood.

6482. Does this timber grow in any other part of the world besides Africa?—Not that I know of. It forms immense forests in Cape Colony and the borders of Natal.

6483. It is not found in South America?—No, according to the Kew Index it is a South African plant pure and simple.

6484. Is there any botanical name which would cover all the woods which contain this poisonous alkaloid?—Yes, there is the botanical name *Gonioma Kamassi*. That would cover Knysna wood, but *Gonioma Kamassi* will not cover all the others.

6485. There is no name that will?—No, certainly not. That is one of the points that I always think ought to be attended to much more carefully than it is. That plant should be known authoritatively, say, to the Chamber of Commerce or to some other authority, by its scientific name. There would be no mixing it up with other woods if it were known by its scientific name, but if it is only known by its trade name it is quite impossible to say what wood it is.

6486. (*Professor Allbutt.*) I think I understand, Mr. Harvey Gibson, that your experiments were confined to Knysna wood?—Yes, entirely. I immediately dropped the West African when I discovered that the men were wrong, that they were really using not West African, but South African all the time.

6487. Then you do not offer us any other evidence?—I do not offer at first hand any other evidence, although I may say I have good reason to suspect that the so-called West African boxwood has also got an alkaloid in it.

6488. (*Dr. Legge.*) Is the appearance of the West African boxwood very like that of the South African boxwood?—Yes, it is quite like it. It would be very difficult to tell the difference even microscopically; but there is one character of the West African boxwood, and it was the first thing that made me suspicious that there were two woods concerned; it was this—that the West African boxwood (I mean the *Sarcocephalus*) has a number of small cavities in it, from the size of a pinhead to the size of a pea, with a little yellow ochrish sort of stuff in crystals. I hunted over the Knysna wood sent to me, and, as far as I could ascertain, it contained no pockets. The pockets in the other contained a crystallised alkaloid. I did not make any experiments with them. There is no doubt that the *Rubiaceæ*, to which *Sarcocephalus* belongs, contain alkaloids.

6489. Do you think the importers of these woods in Liverpool would be able to give one samples of the wood, and say definitely, "This is West African *Sarcocephalus*, and that is South African or Knysna"?—There is not one importer in a dozen who knows the botanical source of the woods he is dealing with.

6490. Do you mean that they are ignorant?—I do. I mean that what happens is that a log of wood is brought down to the coast—I have had it told me again and again—at Lagos, or thereabouts, it is put on board ship on the chance of its being good wood, it comes to Liverpool Docks; a timber merchant says, "It is good wood for my purpose; I will have a hundred tons." He calls it mahogany or box, because it is like mahogany or box. Sometimes that wood comes, and sometimes another wood comes that is like it. There is no check or system at present in use by which a man who imports a single log can be sure he will get 100 tons of that wood at any time he wants it. The proper thing to do would be to have every log of new timber that comes down, say, to the Gold Coast, numbered and a section preserved.

6491. (*Professor Allbutt.*) Does it come with the bark on?—Sometimes with the bark and sometimes not. *Sarcocephalus* is called by the people there "N'gulu Maza," or "N'gulu na mai," because the bark is like the skin of the water hog. I succeeded in getting a bit with the bark on.

6492. With the bark on it could be discriminated?—Yes, but that is not safe even. The only safe way is to get the flower and fruit. I do not say it is absolute. As is well known, there are a great many woods which have definite histological characters one recognises, and that a wood is of that order or somewhere near it. Ever since this matter came up (I have thought of other cases as well) I have set to work to get photographs made of sections of all the woods of commerce, all magnified to exactly the same proportions—all multiplied by ten. I have now well on 2,000 photos, and these are all catalogued in their natural orders. If a section of wood were to come to me now, and I was told to find out what that was, I should simply make a section, magnify it ten times, and compare it with the thing I suspected. Even that, of course, is not absolutely accurate, because questions of temperature, moisture, or any conditions under which the plants grow, would cause certain changes in the size of the vessels, and so on, but still there are certain diagnostic characters you recognise as characteristic of certain orders, and we hope thereby to limit the chances of errors should any such case come again. I think myself if these various logs were only sectionised and a section kept, and a number given to it, and it came to us with a number, or was sent to Kew or, say, even to Liverpool alone, with some of the leaves and dried flowers, and perhaps the fruit, if it were possible, we then could tell exactly what the plant was, and notice exactly its character—whether it was a new species of poisonous or non-poisonous wood, and we should be able to send back word to the exporter in Africa to the effect that for instance, No. 56 was *Gonioma Kamassi*.

6493. (*Dr. Legge.*) Apart from this particular South African boxwood, do you know of any other woods that have been introduced in an indiscriminate way that have had to be given up because they produced injurious effects?—I have known plenty of woods which have been brought here under false names; for instance, there is one plant at the present moment—it

is not a poisonous wood—called bastard logwood. It, however, contains no logwood dye. I do not know myself at first hand of any other wood that has been accused of having pathological effects.

6494. I was thinking of a wood called West Indian satin wood; it has caused dermatitis?—I have not come across it myself. I cannot speak at first hand.

6495. Then, again, a sample of Borneo rosewood, which you told me is not a rosewood at all?—It is not. I do not go further than that. I really think that the whole question is a very important one, and should be taken up in detail.

6496. But conditions like eczema, ulceration of the skin, can be produced by certain woods?—Undoubtedly. I mean certain volatile oils and non-volatile oils are given off from wood or other parts of the plant, which often cause intense irritation, such as *Rhus toxicodendron*, *Primula obconica*, *Asparagus officinalis*.

6497. That is not used in commerce?—No, but I believe *Rhus* has been used in error.

6498. You could yourself tell the difference between *Sarcocephalus* and *Gonioma*?—Yes.

6499. (*Chairman.*) Have you noticed any resemblance between this alkaloid and curare?—No. I have not been dealing with payalysis of the sensory or motor nerves. What I have been dealing with is direct action on the heart. I have not done any experiments with indirect action through the nervous system, save the nervous system in the heart itself. Curare is, of course, a well-known nerve poison, and would indirectly act on the heart.

6500. Do you think it is impossible or improbable that this may also be a nerve poison as well as a heart poison?—I have not the slightest doubt about it. I had a conversation with Professor Sherrington yesterday. He said that he had no doubt whatever it would affect other organs in the body; but the heart was the one he went for straight. We did not experiment with live animals as a whole.

6501. How did you get your information that the men worked half naked?—They told me themselves. That was the secretary's statement to me when I catechised him on the first occasion. His description is here. "Finishing is, however, done by hand, and each finisher works, I was told, for about one hour per diem at this phase of the manufacture. Naturally much dust is created, more especially in the final sand-papery stage, when the workmen are extremely lightly clad, being often naked from the waist upwards." They told me that themselves. I have only, of course, their word for that particular custom.

6502. (*Dr. Legge.*) The effect of this poison upon the heart is to arrest its action?—Undoubtedly.

6503. Therefore it would have the same effect, or would probably have the same effect, on the respiratory system?—And probably, in the long run, on the digestive system—I am not a medical man—anything that the vagus nerve has to do with. It is that nerve which is affected chiefly in the first instance, anyhow.

Mr. JAMES REID, M.B., C.M., called in and examined.

6504. (*Chairman.*) You are a medical practitioner in St. Helens?—Yes.

6505. You have been there for a number of years?—Twenty-six.

6506. You have had a very large experience of the chemical workers of St. Helens?—I have.

6507. Are you of opinion that they suffer from any trade diseases through their occupation? I mean to say, other than chemical poisoning?—No, I think not.

6508. No lung troubles or lung diseases?—No; that is to say, I think they give an individual who is somewhat inclined to bronchial mischief bronchial catarrh or bronchitis; breathing the atmosphere that you get at times in a chemical yard would tend to aggravate it.

6509. What sort of fumes especially would aggravate it?—Ammonia, for instance, or any irritating fumes. There is sometimes chlorine—hydrochloric acid.

6510. Nitrous fumes?—I do not know whether they have nitrous fumes. There is the packing of bleaching powder.

6511. Should you say that bronchitis was more frequent amongst the workers exposed to those fumes than amongst other people?—I think somewhat more so.

6512. But not greatly more so?—Not greatly more so.

6513. So, if you had a case under your care of a man suffering from bronchitis, the man having been working in those fumes, you would not be able to say with any degree of certainty that his bronchitis was due to his employment?—It is quite impossible.

6514. You would not even be able to say that it was probably due to his employment?—No.

6515. Have you noticed any different forms of bronchitis amongst persons engaged in dusty processes? Have you noticed any difference in the bronchial symptoms from those shown by people who are not engaged in those processes?—I cannot say. They change so. A man will be working at one process for three months or six months, say, and then at some other process.

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*Mr. J. Reid,
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Mr. J. Reid, 6516. (*Professor Allbutt.*) You have no very dusty trades, perhaps, in St. Helens?—Not now. There is the packing of the bleaching powder, and there is some little dust about that; but in the grinding I understand it is done away with entirely—that is, in the bleach mill.

6517. (*Chairman.*) Do you come across cases of gradual poisoning from various chemical products—I do not mean sudden poisoning?—Not unless an occasional case of lead poisoning. Except that recently I think I have noticed something in connection with arsenic, not poisoning—it is local, more a sort of, I do not know what it is, dermatitis—extreme irritation of the skin, and the surface gets broken.

6518. This Committee is not called upon to investigate poisoning by arsenic, because it is already in the schedule?—I know that, but this was a local action.

6519. Do you find phthisis frequently amongst persons engaged in the chemical industry?—No; I am rather inclined to think less frequently than in the ordinary labourer.

6520. (*Professor Allbutt.*) Is there something anti-septic in it?—Yes, I presume so.

6521. (*Chairman.*) Workers in chlorate of potash powder, do they suffer from any particular complaints?—I understand a form of anæmia. I never came across a case.

6522. You have heard it spoken of?—Yes.

6523. Would it be anæmia that could be distinguished from anæmia from other causes?—I understand so. I am not quite clear upon that point myself.

6524. You have sent me some tables of statistics relating to diseases from which workers engaged in chemical processes suffer. Will you explain to the Committee what you gather to be the lesson to be learned from those statistics?—That bronchitis with some of the older subjects, the more chronic sufferers from bronchitis, is probably more marked than amongst ordinary labourers; and they are incapacitated from work for considerable periods, according to the weather and according to the winter.

6525. Which figures go to show that?—Here are eight

men who are incapacitated for 228 days; five at another works for 444 days.

6526. These are statistics supplied by a sick club?—By a sick club. It was a troublesome thing to make. I only got it a few minutes before I sent it off.

6527. Do you know whether the sick club gives sick pay if people are incapacitated for a short time?—Certainly, for a week. I do not know whether they would pay for anything less than a week, but certainly for a week.

6528. And those figures all show that incapacity from bronchitis is more serious amongst the people engaged in that trade than you would expect elsewhere or is usual elsewhere?—I do not think I should use a term quite so strong as "more serious"; it is somewhat more so, I think.

6529. Somewhat more what?—More than in other work.

6530. More prevalent?—Somewhat more prevalent.

6531. (*Professor Allbutt.*) What do you think are the causes? Do you think it is due to irritative fumes of any kind, or is it due to the character of their work—such as draughts and exposure?—I think to a certain extent, as I said, in the case of people who are somewhat susceptible they suffer from these fumes.

6532. It is irritative bronchitis?—It is.

6533. Would you tell me the kind of physical signs that you get in these cases?—In the earlier condition?

6534. Is it that you have the ordinary signs of common bronchitis?—Just the ordinary signs.

6535. Not those obscure fibroid changes?—No, not fibroid phthisis.

6536. You do not suggest anything of that kind?—No.

6537. And you hear crepitations about the chest?—Yes.

6538. Of a very obvious kind?—Very obvious.

6539. The summing up of this is that it is ordinary bronchitis, whatever the cause may be?—Yes.

Mr. R. PROSSER WHITE, M.D., called and examined.

Mr. R. P. White, M.D. 6540. (*Chairman.*) You are a medical man, I believe, in practice at Wigan?—Yes.

6541. You are also certifying surgeon under the Factory Acts, and you have had considerable experience of men who are employed in the manufacture of explosives?—That is so; certain explosives.

6542. Do those men suffer from any diseases caused by their occupation?—Yes.

6543. What diseases?—The poison due to di-nitro-benzol. I think you probably know all the symptoms. You have the full details in my writings and investigations and other people's work on the subject.

6544. Are you of opinion that those symptoms can be easily diagnosed as due to that particular cause?—I do not think they can be under every circumstance.

6545. I mean if you knew the history of the case?—If I knew a man was working amongst di-nitro-benzol I think there would be no difficulty at all, but supposing a man were working down the pit where there was gas—firedamp, for instance, or black damp, which causes some similar symptoms—I think it would be very difficult to distinguish the two.

6546. An expert observer, knowing that the man was engaged in a process in which di-nitro-benzol was produced, would be able to say that his illness was due to that cause?—An expert man, knowing that the patient was working in di-nitro-benzol, would know it was from that cause. But supposing a man has a sudden faint—if a man goes into a vat or into some suffocative gas he would of course probably have convulsions or coma at once, but there might be other causes which might simulate di-nitro-benzol poisoning.

6547. Do you get di-nitro-benzol poisoning acutely?—We have no acute forms. I have not seen an acute form of poisoning for some years.

6548. You come across chronic forms from time to time?—Yes, a lot of them.

6549. For how long a time would a man be in-

capacitated—I mean prevented from going to work?—What do you mean by work? The men are able to work at the present time, and do work. We have occasionally a case of suspension from work, but what I mean is this: the men do work at the present time, although they are suffering from some of the effects of chronic poisoning.

6550. I am speaking of cases in which men are actually prevented from following their employment, and are prevented for a period of a week, which is the period now fixed in the Workmen's Compensation Act?—It is rather difficult for me to explain. If a man suffers from mild di-nitro-benzol poisoning; he has of course more or less sub-acute symptoms. That man with a week's time rest and treatment will probably be able to do a certain amount of work. To an ordinary inexpert individual and to himself he feels that he is able to do his ordinary work, but that does not say that he is free from the poison in his system.

6551. But we are concerned with the workmen's compensation, and not directly with any question of trying to prevent these illnesses. A workman cannot claim compensation unless he is away from his employment owing to illness or accident for a period of at least seven days. Now do you ever get any cases of men who are away from their employment for a period of more than seven days on account of poisoning by di-nitro-benzol?—I certainly have not had any for some time.

6552. Have you ever heard of such cases?—Yes, certainly, and have had them at times. A man might get it and would be incapacitated for more than that. You understand, Mr. Chairman, that my special point is this: that because a man is able to come back to his work he is not necessarily fitted for hard work. Mr. Legge will tell you that he has seen men working with certain symptoms of di-nitro-benzol poisoning which were quite distinct to anybody who knows anything about the subject. That man I speak of is able to do a certain amount of work; he is not fitted for hard manual work, but is quite fit for the work which he

does there. If he were asked to do blacksmith's work or heavy work he probably could not do it, and he could legitimately claim that for a prolonged period he will suffer from some of the symptoms of a mild form of chronic di-nitro-benzol poisoning.

6553. He has been weakened without being incapacitated?—He suffers from a chronic form of poisoning. As a matter of fact, we have now no cases that are precluded from work.

6554. (*Professor Allbutt.*) Is it stationary—does not it go on increasing?—I do not think it is a cumulative poison. In my opinion it is not a cumulative poison. I think after a certain amount of exposure to fresh air and so on, and absence from work, the men get practically free. You see, it is a blood destroyer. It destroys the actual blood corpuscles, and those have to be re-made. As soon as those are re-made the man is practically well again.

6555. (*Chairman.*) In the meantime does he suffer a loss of wages while put to less arduous work?—Not in my factory. They treat them very well.

6556. Do you know any cases in which men would suffer loss of wages by transference to other departments?—Not in our factory. They are very good to them.

6557. Have you heard of cases elsewhere?—I have not.

6558. Of course the case would be rather a difficult one if we were to suppose that poisoning from di-nitro-benzol were included in the schedule to the Workmen's Compensation Act, and it was found afterwards that men could never claim compensation because they were not prevented from working, and no claim could be made because the sufferer had been kept away from work for seven days?—But as a matter of fact, as soon as ever these workpeople get to know, or the general run of medical men get to know, the symptoms, which they can by reading up the subject, they would readily imagine or actually find symptoms common alike to di-nitro-benzol poisoning and to some other ordinary complaints, and those workmen would immediately pose as claimants under the Act. There is no doubt it will come the Compensation Clause.

6559. How do you mean?—What I mean is this: that a workman handling or working constantly in di-nitro-benzol requires more than a fortnight's time for the poison to entirely disappear out of the system. Difficulties in this class of case will arise—first, as to the length of time necessary for the poison to entirely disappear from the body; secondly, how far ordinary symptoms, such as palpitation, general weakness, anæmia caused by other concurrent diseases (liver, heart, lungs) have been aggravated or made worse by the presence of the poison.

6560. Although they really could work?—Although they really could work. May I give you a case? Some little time ago I was called to see a man who had been ill a whole month. He was supposed to be gassed by di-nitro-benzol fumes down the pit, and the man considered the ill-effects of one short exposure entitled him to claim compensation for his illness lasting more than a whole month. I know, of course, that so long an illness from such a cause is highly unusual, and that a man has recovered before then from what they call "gassing"—to use the ordinary term that they use although there is no such thing as "gassing" from di-nitro-benzol. A doctor had attended this man, and had given certificates for a whole month that he was suffering from "gassing" down the pit—from di-nitro-benzol poisoning. I found that he was suffering from stone in the kidney, which of course had no connection whatever with di-nitro-benzol. I saw the doctor. After discussion of the sick man's symptoms with his medical attendant, he discharged the man. Now those are the sort of cases we get, and those are the cases that are difficult. May I give you another instance of the difficulty I can foresee in these cases? I mention in my paper meningitis. A well-known surgeon was called by my company to attend an inquest on a man who was supposed to have died of acute poisoning from di-nitro-benzol. They had had a post-mortem, and they had found pachy-meningitis—some adhesions in the brain. The surgeon said that these might be caused by di-nitro-benzol fumes, and of course the man got the benefit. Now we know very well that di-nitro-benzol is a purely narcotic poison, and cannot produce any physical lesion such as pachy-meningitis. I have only seen one case of death from di-nitro-benzol poisoning.

6561. You consider that it is essentially a very difficult matter to discriminate between cases of di-nitro-benzol poisoning and other cases, or is it difficult only until you know the difference?—I am going to give you two instances which I think will appeal to you where the ordinary medical man makes such mistakes.

6562. But a medical referee who was well acquainted with the symptoms of this poisoning would be able to distinguish?—Some medical referees have no knowledge.

6563. But a medical referee might be appointed with special knowledge?—An expert on the subject would always be able to do so.

6564. Do you ever come across any cases in your district of coal miners who suffer from any lung trouble from the inhalation of coal dust?—No, I do not think I do. That is anthracosis. Although I have been in practice for many years, I cannot say that I ever do so. I have no doubt that there are such cases. I should not like to give a decided opinion on the subject.

6565. (*Professor Allbutt.*) I understand you, Dr. White, that, putting accident out of the question, and speaking exclusively of persons who have been submitted for a long time to the di-nitro-benzol, these are cases of chronic poisoning?—Yes; these are the ordinary cases I meet in my periodical examinations. If these men are put on to different work or leave this particular employment I am of opinion they completely recover after a variable period.

6566. The blood value drops while the man is at work, but in a short time the workman would completely recover if taken away from it, however long he had been submitted to it?—First of all, a small dose of it would produce dizziness, headache, nausea, mental confusion, unsteadiness of gait, discolouration of the mucous membranes, and a dusky colouration of the skin; in some individuals prolonged exposure to small doses, it would produce peripheral neuritis.

6567. That is what I want to get from you.—It also produces anæmia, and certainly it produces eventually a form of fatty degeneration.

6568. That is what I thought you were going to tell us?—I had not been asked by Mr. Samuel.

6569. (*Chairman.*) I thought we had all the symptoms before.

(*Witness.*) Might I ask who has been giving evidence on this di-nitro-benzol before.

6570. (*Professor Allbutt.*) I knew little myself about it three months ago; but we have had a good deal of evidence, and visited works.

(*Witness.*) You have not mentioned that proportional law—that actuarial question I mentioned. That is really the great difficulty we have—for instance, in estimating the relative proportion of disablement due to the effects of a poison, and, say, some other weakness or disease, hereditary or otherwise, present in the employee. Supposing a man is suffering from anæmia or any illness, he puts it all down to this special kind of poisoning. May I mention a case?

6571. (*Chairman.*) Do, please?—A doctor was attending a case. This case happens to be a case of consumption in the lungs with tubercle in the testicle. The doctor attends the man privately, also as his club doctor. The man breaks a blood vessel when he has just left his work in a coal mine, and is brought up and dies shortly as the result. The medical man in attendance naturally feels diffident in giving evidence, having attended the man personally, and knowing that he is a consumptive case. They ask me to make a post-mortem and give my evidence. I make a post-mortem. I find the lung is riddled with cavities, and I also find, of course, this tuberculous condition of the testicle. Then the jury say to me, "What has he died of?" I say he has died of consumption, due, of course, partly to the hæmorrhage that he had. They then ask me, "Has the man's work in the pit, by favouring the hæmorrhage, accelerated death by five minutes or by any length of time?" I answer I cannot say it has not. He might have done the same thing getting out of bed or from drinking an extra glass of whisky and water. His life could not have been a very long one, so far as we know from the condition found post-mortem. Then I say the strain of exertion at the man's work has accelerated death. The man's life was in all physical knowledge a poor one, but just the extra work that he had down the pit is supposed to have made him liable to what

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Mr. R. P. White, M.D. happened, and everything was given in that man's favour. Those are the difficulties.

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6572. Those difficulties must arise in workmen's compensation. A man is killed at the age of 75, another at the age of 25. The dependents get the same compensation, although the value of the men's lives is very different?—That is what I meant by an actuarial estimate. If a man in perfect health is killed he gets the same value in compensation as the man who is practically dying at the time.

6573. Will you tell us what are the symptoms of poisoning by di-nitro-benzol?—In the acute form, do you mean—coma?

6574. In any form, not sudden poisoning, but gradual poisoning?—In the gradual poisoning a certain amount of nausea, faintness, palpitation, a certain amount of asphyxia, the urine tinged—that is urobilin—you nearly always get that. Then if you get chronic poisoning you get the symptoms of peripheral neuritis, and this form of poisoning takes place also in men who are shot-firers from improperly handling the di-nitro-benzol. There is a difficulty that comes in with regard to shot-firers who handle the material. I lay very great stress upon the question of the absorption of the poison through the skin. You see, if you put one grain of it to about 25 grains of ordinary fat, and rub a small portion into the groin, you will at once have marked symptoms of blueing of the face. It has a most extraordinary action on the skin in that way.

6575. What symptoms would you have?—Just a slight faintness and slight giddiness, a little nausea and slight discolouration of the lips and mucous membranes.

6576. (*Dr. Legge.*) That is to say, a very considerable number of red blood corpuscles must be destroyed?—Yes, and with the hæmoglobin a chemical combination takes place. You do not get meta-hæmoglobin; it is not quite certain what the precise change is the blood undergoes.

6577. (*Professor Allbutt.*) All the men suffer to a more or less degree, then?—Yes. You mean, I presume, men working in the stuff?

6578. Yes, all men who are submitted to this?—Yes, you cannot avoid it.

6579. Is there any large difference in personal susceptibility? Is this a large element in the matter? Supposing, for example, two men to be submitted to the action of this poison for six months; each would show symptoms, but probably not to the same degree, and one might get peripheral neuritis and the other not?—On the whole it is fairly equal in its effects upon all persons subjected to it under like circumstances, but there are some nervous people with a special susceptibility to it.

6580. The opportunity for men to throw themselves (if I may use the word) prematurely upon compensation would be during the preliminary period, before anything like peripheral neuritis had established itself?—Yes.

6581. Would all the men probably go on to peripheral neuritis, or nearly all, if submitted to it for a certain number of years?—Yes, the difficulty I have to suggest to you is this: supposing you have a shot-firer. A shot-firer even may inhale gas in his work down the pit, which is due, of course, to black damp. So far as the physical effects, they are simply due to want of oxygen in the blood. The symptoms produced by a man handling and opening these cartridges (when he should not do—he has no right to have to do it, but if he does it the symptoms produced by opening these cartridges and handling the di-nitro-benzol they contain) would be the same as you would get from getting into an atmosphere of, say, fire damp or black damp down the pit. Hardly anybody could distinguish between the two.

6582. That we should call "accident" from our point of view. Why do they open these cartridges?—To put in a detonator. Sometimes they used to break the cartridges in half to make the charge smaller.

6583. Do you consider from the symptoms that the men suffer as much as they did ten years ago?—In the other room I have some statistics which show you that we practically now have very slight cases. These favourable results have been brought about prior to this poison being scheduled as a dangerous occupation. May I bring those statistics in?

6584. (*Chairman.*) Please do.—I think Dr. Legge has seen them.

6585. What is your factory?—At our factory where I am working at we make three things—roburite, amvis and negro powder.

6586. What is the name of the factory?—The Roburite Works. Roburite contains di-nitro-benzol, about 12 per cent. Amvis contains about 6 per cent. In the negro powder it is di-nitro-toluene. We are doing very well, but even now Dr. Legge is not satisfied. This table refers to 1888. It was not scheduled then. This is work I used to have to do. I used to write a report every half-year to the directors. This is just one of the reports that I found. Here is an average summary of sickness for six weeks in that year—partial sick and total.

6587. What date is this?—1888. It is going a long way back. The funny thing is that I think the proportion of di-nitro-benzol used was very nearly the same—it might be a little more, but I do not think enough more in my own mind to make a difference. Now we have practically very few cases of suspension or illness. You see the enormous ratio we used to have. (*Handing in table.*)

6588. Going up to 10 per cent.?—Now that is quite over.

6589. What proportion of the men roughly now suffer more or less from di-nitro-benzol poisoning?—You mean slight symptoms?

6590. Yes?—In those actually employed I think you cannot quite avoid certainly some slight symptoms, but these reports show the number of cases where men were absolutely prevented from working, and who came to me in an absolutely helpless state.

6591. That showed that in a seven days week you had from 6 to 10 per cent. twenty years ago?—Yes.

6592. Now how many persons would there be?—Only very few; four or five in the course of a year that I have to knock off work.

6593. (*Dr. Legge.*) Is it not a fact that the workmen now know about how much di-nitro-benzol they can stand, and that they voluntarily retire from the work for a few days, perhaps a week?—Yes. One reason also is the management at the works do not press them. We do not give them more than about three days' work. If we put a lot of extra work on them we might have trouble.

6594. When they go off in that way will they get their wages paid just as though they were working full time? You see, they are practically suspended from work while they are making up their red blood corpuscles?—Well, it so rarely happens that they have to go off for that special reason that I hardly think your difficulty comes into operation. I do not think so.

6595. It is very important that they should not be pressed?—It is important, and they are not pressed. We have relays. We put them on to other work. If there is any man who feels not well he is at once put on to some other work which takes him outside, and his wages go on just the same. I think that is the feeling of the management there. I do not know of any hardship ever having occurred. May I give you an instance? There was a man had pneumonia, which had absolutely nothing to do with the work. The management paid him, I think, if not for the whole time he was away, for nearly all.

6596. You mentioned that you thought that the skin was one of the main ways in which the poison entered?—I do.

6597. What other ways are there? Do you think it is inhaled?—I do.

6598. As a vapour?—As a vapour it is very deadly.

6599. So that it gets into the system through the skin?—Yes.

6600. And through the digestive tract and through the lungs?—Yes, that is so.

6601. Have you examined the blood microscopically, and can you see anything there which is characteristic?—Yes.

6602. And differing from the blood in anæmia from some other cause—is there anything distinctive in the microscopic examination of the blood?—A man must be a very expert medical man to tell that. You know what I mean. You are asking rather difficult questions. There are so many different forms of anæmia, as you

know, and you know as well as I do that it would be a very difficult question to answer. The darkening in colour, the presence of coloured megalocytes, blood granules, and the large number of crenated and broken up red corpuscles might materially assist in the deferential diagnosis from other forms of anæmia.

6603. Do you know if that work has been done at all?—I do not think it has as much as is necessary.

6604. By minute study of the blood changes?—Not comparatively with other forms of anæmia, but I think you would be able to distinguish. I think there would be enough in the discolouration of the blood.

6605. What colour is it?—A peculiar chocolate brown colour. That of course would be distinctive at once. You are alluding to cases which have been months old, perhaps?

6606. Do you mean that people can go on working with their blood in a chocolate coloured condition?—You have been round the factory there; you have seen the colour of the men's skins, have not you?

6607. What I want to get at is this. You say once it became known that a person could get compensation they would stand away?—I think they will.

6608. My point rather is that if they have their blood in a chocolate coloured state they are deserving of compensation?—Quite so.

6609. And that they ought to be suspended from work?—If you examine the blood of any of these fellows. I do not say it is chocolate brown. This only happens in severe and long exposure to the poison. In such cases you get a large amount of hæmolysis; you get the blood cells destroyed; they are broken up; there is no doubt about that. I have seen it in animals. It has been accepted, I think.

6610. Is there some definite paralysis of the muscles of the hand which is a guide to you?—Yes.

6611. Will you mention what those are?—The hypothenar eminence. You get a certain amount of wasting in chronic cases, and yet get the inter-ossii also—feeble also.

6612. But it is distinct from wrist-drop, for instance?—Yes.

6613. It is different from that caused by arsenical

poisoning?—It is characteristic of many cases of peripheral neuritis.

6614. But the wasting of the hypothenar eminence?—I should not like to say it is different from arsenical poisoning.

6615. Do you get paralysis of the forearm?—No.

6616. Or of the upper arm?—No.

6617. Or of the deltoids?—No, but I have seen arsenical poisoning without that.

6618. I am thinking of distinguishing it from lead?—You can distinguish it from lead.

6619. Is there foot-drop—is there anything characteristic about the gait of these men?—No, but in acute cases or sub-acute cases you get the gait of a man who is drunk.

6620. Have you experience of aniline?—I cannot say that I have. I have seen one or two cases of poisoning by aniline; they have been caused by the local applications of this substance.

6621. Done experimentally?—No, from works close to me, where that case of chrome poisoning came from.

6622. Do you mean aniline black dyeing?—Yes, I have only seen two cases.

6623. What did they come to you for?—Because of a rash on the hands.

6624. That would be due to chrome?—No, I thought it was due to the aniline.

6625. Had they any changes in their blood or in the colour of the lips?—Not when I saw them.

6626. You mentioned that poisoning from this di-nitro-benzol would not occur underground. Were you referring to miners?—Yes, I was referring then to the effects of the explosion of high explosives in which di-nitro-benzol is used.

6627. Of the gases from those from the explosion?—Yes.

6628. Afterwards you referred to cases which had actually occurred, and you said that they have been from handling?—Yes, that does occur. I have seen cases of it. There is no doubt they occur. You can generally tell when a man does it. You find in his hand a peculiar yellow appearance, quite characteristic.

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TWENTY-FIRST DAY.

Friday, 8th February 1907.

PRESENT:

Mr. HERBERT SAMUEL, M.P. (Chairman).
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.
Mr. FRANK ELLIOTT (Secretary).

At the Clayton Aniline Works the Committee examined some of the workmen in the aniline oil department who had worked more or less continuously there, and who presented no signs of ill-health.

In the di-nitro-benzol department men were shovelling out the product, and the Committee

examined two of them. Both these men wore respirators, india-rubber frames with sponges in them. One of them showed no signs of poisoning. He had only worked for a month. The other man, who had worked for six months, assured us that he was perfectly well, and was not short of breath, but he presented evident signs of anæmia in the eyes, gums, lips, and so forth.

Mr. SYLVAIN DREYFUS, called in and examined.

6629. (Chairman.) You are the deputy manager of these works which you have been kindly allowing us to visit?—Yes.

6630. Do you have many cases of sickness occurring amongst the men employed in these works?—We have not.

6631. Have you ever had any case of illness which

you would attribute to the men being engaged in these occupations?—We have had, yes.

6632. Were they incapacitated for a long time?—From aniline oil—from one to eight days, at the outside.

6633. You have never had a case of a man being away for longer than eight days?—We have not.

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6634. With di-nitro-benzol?—With di-nitro-benzol from one day to about a fortnight or three weeks.

6635. How often would a case of that kind occur with respect to men working in di-nitro-benzol?—Perhaps once every year.

6636. And with anilin?—With anilin once every two years.

6637. Do you attribute those cases of illness to any sudden definite cause—that is to say, some defect in the apparatus or anything of that kind, or should you say it was a chronic complaint due to working for some period in the fumes?—It generally happens in the case of accident; if, say, a man gets some of the substance (aniline oil) on his clothing mostly or by inhaling. With di-nitro-benzol it seems to be chronic.

6638. Do you adopt any special precautions with a view to avoiding these occurrences?—We have all the necessary appliances like respirators, and instruct our men to take those precautions to avoid it; if they get any of the substance on their clothing to have the clothing immediately removed, or if they get any on their skin to have themselves washed directly after.

6639. Do you ever get cases in which men say that they are suffering from the effects of one or other of these poisons, and really their illness is due to some other cause?—We have not had any cases.

6640. You think it is easy to diagnose those complaints that come from those poisons?—I think so. I think it is very easy.

6641. You have not had any case of any man who has been ill for longer than three weeks so far as your recollection goes?—That is my personal experience.

6642. Over how many years?—About 16 or 17 years.

6643. (Professor Allbutt.) Do you supply the respirators to the men?—Yes.

6644. You supply the respirators to the men, and you instruct them to use those respirators?—Yes, we arrange the respirators ready for the men.

6645. I suppose the shovelling out of the di-nitro-benzol is the most dangerous part of the occupation?—I do not think so.

6646. Which do you think is the most dangerous?—I think it is the inhalation of the di-nitro-benzol when in a liquid state.

6647. Did we see that?—Where the di-nitro-benzol is melted.

6648. That seemed to be carried on in closed vats?—It is carried on in closed vats, but if the man opens the apparatus, for instance, then there is that danger.

6649. That would be an immediate effect, an accidental effect, so to speak?—The greatest effect.

6650. Is it part of their regular duty to open these vats regularly?—It is not.

6651. How often would a vat have to be opened in such a way as to make it dangerous?—A vat is only opened when it wants water in it, which is once for each operation.

6652. Then so long as the apparatus is working properly it ought not to be opened at all?—It need not be.

6653. Practically never if it is working properly?—That is so.

6654. If something goes wrong it has to be opened?—Yes.

6655. You said that might happen how often?—That might happen once a day or once a week; it has sometimes happened two days in succession, or it might not happen for six months.

6656. Would the men ordinarily working in the department have to deal with those special occasions?—We only have those men that are actually working in that department who are allowed to deal with those things.

6657. Then when these vats are opened do you generally anticipate that somebody will be more or less temporarily poisoned with it?—We do not.

6658. Generally speaking it goes off without your hearing anything?—Yes.

6659. Is there any difficulty about casting that di-nitro-benzol into blocks; could it not be cast in cubes or blocks?—There is no known way of doing it.

6660. Because in Huddersfield and here it struck me

that this is perhaps the most dangerous part of the occupation. Opening the vats may be more so; but, speaking of their habitual daily work, the men seem to be more blanched about the face and eyes, and so on, in this department than in the others?—Do I understand you aright? You say at Huddersfield.

6661. Yes, and Bradford, perhaps, too. At any rate, wherever we have seen men digging out the di-nitro-benzol I think those men seemed more blanched than the others?—They were more affected then.

6662. (Dr. Legge.) The people who were engaged in chopping it up.

(Witness.) May I ask one question—do they use respirators?

6663. (Dr. Legge.) No.

6664. (Professor Allbutt.) Your men who are wearing respirators and who, I have every reason to suppose, are well as far as they know, yet have evident marks of poisoning about them upon their complexions?—I think that a man that is working in di-nitro-benzol always shows signs.

6665. They always look like that?—Yes.

6666. But there is no way of running the di-nitro-benzol into moulds; it must be dug out by hand?—We do not know of any way, or we should be very glad to adopt it.

6667. (Chairman.) Do the men as a rule work continuously in this process, or do they have a few days in the di-nitro-benzol process, and then turn their hands to something else?—We have adopted the plan within the last twelve months that we do not keep them at it continuously. We keep them, say, a week or a fortnight or three weeks in that one place, and then take them out into other departments.

6668. You think that change of method has a beneficial effect on their health?—I think so.

6669. Do the men, in fact, use the respirators which they are expected to wear?—It is very difficult for us to make them do so; in fact, it is practically impossible. I had a case the other day. I went through and found a man having the respirator off. I called the manager of that department, and directed his notice to it. He said, "I have just left the place, and the man had the respirator on then." He was then only 20 yards away from the place. I went back to the man and told him that he must wear it. He said that he did not like being muzzled. It is the most difficult thing in all chemical works, not only here, to get the men to wear respirators. We have experience that in most chemical works the men will not use respirators unless somebody stands beside them to see that they do wear them.

6670. (Dr. Legge.) Do you think that that sponge can in any way intercept the vapour?—Yes, the vapour coming into contact with the water in the sponge is intercepted and the sponge will retain the vapours.

6671. That water in the sponge must make it a little difficult for the air to pass through; the water takes up space; consequently they will get the air coming through by the shortest and easiest channel?—The sponge is only slightly saturated with water. It is put in water, and all the water is squeezed out, and only then is it put into the respirator.

6672. This anilin vapour is dissolved in water readily?—Very readily—anilin and nitro and di-nitro.

6673. When it has been dissolved by the water in the sponge, that water is giving up vapour constantly?—There is so very little water in it.

6674. That water must constantly be evaporating from the sponge?—To a small extent, yes.

6675. So that the men would still get di-nitro-benzol vapour notwithstanding the sponge?—I should think that there is hardly any, because the cold air passing through it will keep the sponge cool.

6676. You lay stress on the importance of bathing when the material has got on the skin?—Yes, and we have provided a bath on the premises.

6677. Do you believe in milk as useful to administer?—We do. We give the men that work in di-nitro benzol daily milk, and we also give milk to men working in an apparatus where anilin has been in.

6678. Why do you give that?—We consider that it is a preventive.

6679. An antidote?—An antidote to anilin or to di-nitro-benzol; we consider that signs of poisoning will show if no milk is given, or it will show to a smaller extent if milk is given. We find that in anilin and di-nitro-benzol the greatest enemy to the health of the men is that they drink alcohol, and we give the men milk to accustom them to drinking milk and to give them a good example—that they may make use of milk instead of beer or whisky; because a popular idea is that if a man does not feel well he must take a glass of whisky or a glass of brandy, which is very bad in slight cases of poisoning, and more so in serious cases of poisoning. I mean to say that it accelerates to a great extent any effect that anilin or di-nitro-benzol might produce.

6680. (*Professor Allbutt.*) I was going to take one of the Chairman's questions a little further. We could find in your works no doubt a certain number of men who show in their complexions the effect of some one or other of these products; a whiteness under the eye, blue lips, and so forth. One or two of these men show it now quite evidently. Now supposing that one of these men, a malingerer, were to come and assert. "I am ill with the poison of the work," and the physician examining him no doubt discovers these marks of anæmia, do you still think you would be able to distinguish the malingerer from the real sufferer—I rather gathered you said there would be no difficulty?—I think so. I think you could see it, and I think the medical man who knows the symptoms and has seen cases would see the difference.

6681. It is not so entirely subjective, but that there are certain other objective features by which the physician could be guided?—I think so. I think that the signs and symptoms are so marked that it would be very difficult for a medical man who has seen cases not to distinguish.

6682. At any rate, you see no great difficulties in distinguishing the malingerers from the real sufferers?—No.

INDIA-RUBBER MANUFACTURING COMPANY,
BANK STREET, CLAYTON.

The Committee visited this factory, and examined

the carbon bisulphide process. There was nothing observable in the condition of the workers showing that they suffered any detriment from the process, except in the case of one girl, who was pallid-looking, and Dr. Legge thought that her hand grasp was abnormally feeble.

MESSRS. I. FRANKENBURG AND SONS' FACTORY, SALFORD.

In the afternoon the Committee paid a visit to the works of Messrs. I. Frankenburg and Sons.

Alderman Frankenburg, Mayor of Salford, and one of his sons met the Committee, and showed them over the works, in which all sorts of rubber and waterproof goods are made. They told the Committee that bi-sulphide of carbon was much less used now than it was a few years ago; dry heat had been largely substituted for it, but there were certain processes, such as printing on rubber, which could not be done by heat. No worker was allowed for more than two and a half hours at a time in a room in which bi-sulphide was being used, and now they never had any cases of poisoning from it. The firm would not be affected in the least if bi-sulphide was scheduled, even if the workers showed a certain amount of carelessness in regard to their own health. From what the firm heard, bi-sulphide was also used for wool washing and sometimes for fixing leather treads to rubber motor tyres.

As regards naphtha, they said that on entering the naphtha rooms the evaporation was unpleasant for a few seconds, but that the workers were quite indifferent to it.

Dr. Legge recalled a case about four or five years ago, when he visited these works, and a girl in the naphtha room was seized with a hystero-epileptic fit at the time of his visit. Alderman Frankenburg said that that must have been quite exceptional, and he did not think there had been any similar case since that date.

In the room where patterns were printed on thin waterproof cloth by colours mixed with naphtha, the man in charge of the printing machine told the Committee that he had worked that machine for the last 14 years, felt in the best of health, and had never been off work for a day.

*Mr. S.
Dreyfus.*

8 Feb. 1907.

TWENTY-SECOND DAY.

Monday, 18th February 1907.

PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. J. F. ARLIDGE, L.R.C.P., L.R.C.S., called and examined.

6683. (*Chairman.*) Are you a medical man, in practice at Stoke-on-Trent?—I am a certifying surgeon. I am not in practice; I confine myself almost entirely to factory work, and have done for some years.

6684. Have you had considerable experience of the ailments from which the pottery workers suffer?—Yes.

6685. Have you had cases under your care of potters' asthma?—To say under my care would be incorrect. I saw more of them in my younger days, when my father was alive and was physician at the Infirmary. I saw cases when I was under him, and other cases afterwards. My father's book gives you pretty well everything you want to know on the whole thing.

6686. Do you consider that potters' asthma is as prevalent now as it used to be?—Certainly not; it is uncommon now. And may I say something about

that? If you want to find a case now the proper place to seek for it would not be amongst the present-day workers; it would be amongst workers who have worked before the regulations with reference to fans—in fact, people who worked under very bad hygienic conditions in older days. I do not think you could find many cases among the present generation unless there was consumption with it.

6687. Do you attribute the diminution in the prevalence of this complaint to the Home Office rules?—Quite so, and to a great extent with regard to the improvement in the ventilation, etc.

6688. Do you consider it is easy to diagnose the symptoms of potters' asthma?—It depends upon what is meant by potters' asthma.

6689. Asthma that arises from employment in the

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pottery works?—Is that asthma? Asthma would mean spasmodic attacks of asthma, whereas in the case of potters' asthma there is permanent dyspnoea, and the cough is constant after the earlier stages. How one would differentiate one from the other would be in this way. In the ordinary potters' asthma the early stages of the disease are not noticed with the workman at all. If you ask him if he coughs he will say, "No, I had no cough and never had one"; but there is just a clearing of the throat in the morning, especially at first, which becomes a little more troublesome and the same sort of thing happens two or three times a day with a change of atmosphere going out of a hot room. Then there is a difficulty of breathing, and dyspnoea comes on very soon after that. The first complaint a man probably makes is as to difficulty of breathing, and if you say, "Well, do you cough?" he will say, "Yes, a bit, but nothing very much." You do not get the same symptoms as you do in consumption, where the cough commences early, and you do not get very much dyspnoea in early stages, but you get failing in general health, loss of flesh, and hectic symptoms and rise of temperature. In potters' asthma you do not get any such symptoms in that stage. Then, with reference to any consolidated condition of lung, in consumption you would expect to find it at the apex, but in potters' disease you would be more likely to find it at the base of the lung, and if you do find this consolidation, the amount of consolidation found would not suggest the amount of dyspnoea they suffer from. The difficulty of breathing is much greater than you would expect to find from the small patches of consolidation which you would probably get. There is no rise of temperature, no quick pulse, and there is no emaciation as there is in true consumption. Dr. Arlidge in his book deals with the question of bacilli, and he also makes a note, which he specially calls attention to, to enable one to separate the two diseases. The note is: "A difference in the appearance of expectoration of a purulent character is a feature that separates the dust disease from the tuberculous lung." The expectoration in these cases in the early stages and for some continuous time is whitish marked and streaked with black dust, whereas in consumption the purulent expectoration comes on much earlier, and the dyspnoea is quite different. The difficulty of breathing and rise of temperature and quick pulse give you a fair ground for separating the two things, but you are likely to find a debilitated person with hereditary consumption showing a combination of the two, and it would be difficult to diagnose then whether the person was consumptive before starting the work, or whether he was a person liable to anything in the lung setting it up.

6690. At certain stages may you get a fibrous lung which is not at all tubercular?—That is so.

6691. And in those cases questions of consumption do not come in?—No, but they may follow.

6692. At all events, in the earlier stages of the disease?—No, the question of consumption would not come in there, but anybody to arrive at a decision would have to go through all these points very carefully and very minutely. It is a very easy thing for one man to say it is so and another to say it is not so.

6693. Do you think there are ever any cases of lung trouble among potters which an expert doctor could definitely say were due to the employment?—I think you would get differences of opinion.

6694. Do you think you would get differences of opinion in every case?—No, I would not say that.

6695. Do you think there are any cases in which a man was suffering from lung trouble, the man being employed in pottery works, in which a doctor could definitely say, and all expert doctors would agree, that that man's disease was due to his employment?—I think there would be cases, but they would be very few and far between nowadays.

6696. Do I understand you to say there are very few cases now in which the disease is definitely due to the employment?—There are few cases now to be found. Dr. Legge will remember, I think, Dr. Ritchie was sent down by the Home Office, he came with me, and I found out all the suspicious cases in the district I could, and went round with him in order to examine into them.

6697. (Professor Allbutt.) During how many years has the improvement continued—10 years or 20 years?

—I should think the most marked improvement has been during the last 10 years.

6698. (Chairman.) Do you think there would be danger of malingering if potters' asthma were scheduled as a disease, for which there might be compensation?—I am afraid there would be claims that the cough was caused by the occupation.

6699. And then the certifying surgeon would have to state whether, in his opinion, it was so caused, I suppose?—It would put him in the quandary of opposing the doctor who reported the case. If the certifying surgeon is to be a sort of judge as to whether a doctor is right, I am afraid there would be great trouble. If a doctor reported a case of a man to the Home Office as suffering from this disease—

6700. But the case would not be reported to the Home Office; it would be a claim of the workman against the employer, and the workman would come to the certifying surgeon for a certificate that he was suffering from this particular disease?—There is this difficulty—that at the early stages of this disease they do not recognise they have got a cough, and that really a case which might go further on is no more requiring suspension than a case that ought to be suspended at the very start, when there were, I might say, no symptoms of the disease, and yet one would be suspicious if you could only hear the man say: "I have a little cough in the morning." You would then examine the lung, but there is no consolidation at that time.

6701. Is the workman prevented from working?—If he is suspended.

6702. But is he physically prevented from working?—No, the physical signs are wanting; they do not emaciate and lose appetite; they sleep well, eat well, and drink well.

6703. Of course, there would be no claim for compensation unless the man was incapacitated from working; it is only when they become incapacitated from working the question under the Compensation Act would arise?—You mean when they could not work at all, do you?

6704. Yes?—Then comes the difficulty of a change of occupation.

6705. In which branches of the trade is potters' asthma most likely to occur, if at all?—I think in the case of the biscuit placers; not so much in the glost placers.

6706. And in any other branch?—Yes, the scourers'. There are not many biscuit placers in a factory; I mean definite biscuit placers.

6707. How many cases a month of pottery workers do you see?—The whole lot combined. I could not tell you without my annual reports. I see about 340 scourers a month.

6708. (Dr. Legge.) You make about 15,000 examinations in the year, do you not?—I cannot quite remember.

6709. (Chairman.) Of the 300 odd scourers whom you see in a month, about how many would you expect to find showing symptoms, mild or severe, of potters' asthma?—If you ask me those I considered unfit to work owing to the danger of asthma, then perhaps I could put my hand on half a dozen, but to say that any of them absolutely suffer from potters' asthma, I cannot do so. I could put my finger on some suspicious cases, and give the names and where the men or women work, but beyond that I should have trouble to find true potters' asthma, except among the older workers. Some of these so-called scourers are women who are in the scouring shop, and are now employed as what are called emptiers, and, including those, I might find one or two.

6710. (Mr. Cunynghame.) From a non-medical point of view the difference is not very clear, in my mind, between the diseases which are likely to be caused through dust. Six different things occur to me—tuberculosis, phthisis —?—Which is virtually the same thing.

6711. Then there is what is called consumption?—Yes, which is phthisis.

6712. Tuberculosis is a form of phthisis?—Yes.

6713. What is the relationship between bronchitis and asthma and consumption? Are they mere symptoms of the same thing, or are they different diseases?—I should say bronchitis was a different form to con-

sumption, to commence with; then asthma, speaking of potters' asthma, is another form of chest disease.

6714. So that we have really phthisis, bronchitis, and asthma as three distinctly different things?—Yes.

6715. Supposing consumption set up by dust was scheduled, then a person who had bronchitis would not come in under that, would he? He would be told he had bronchitis and not dust phthisis. How would you answer that?—The question is whether bronchitis is not set up by dust, too.

6716. Supposing you were a doctor, and you were asked whether a case was dust phthisis or not, and you found the case was really dust bronchitis, would you be able to put it down as dust phthisis or not? Would dust phthisis, in your view, cover the other things I have mentioned?—I do not like the term dust phthisis, because it is difficult to deal with.

6717. Can you give any short name connected in some way with dust that would cover phthisis, bronchitis, and asthma?—I do not think the dust sets up tubercular consumption. I do not think it is the right way of putting it. If you use the words dust phthisis, I presume you to mean a lung consolidated from the effect of the inhalation of dust. Then, if it was a true case of that kind, the symptoms of true phthisis would be wanting; the fibrous or consolidated lung would be in a different place; there would not be the emaciation and loss of flesh, and the fever and temperature, and those things would not be the same; so that if you like to call it dust phthisis, not meaning consumption at all, then dust phthisis will carry it.

6718. According to you, at all events, then, there are two kinds of phthisis, one produced by dust, and the other by other causes?—If it is to be called phthisis.

6719. If you do not call it phthisis, would you call it consumption which is set up by dust?—I should call it fibrosis set up by dust.

6720. Would dust consumption do as a term?—Yes. I want to keep clear of the word tubercle, because that is hereditary.

6721. So that by dust phthisis would you mean phthisis caused by dust as distinguished from anything hereditary?—Yes. You see, a person who is an emaciated, weak person, who may not have absolute consumption, may go into this work, and if there is any liability of consumption coming on then you get true consumption by the very fact of working in some occupation which was doing him harm and setting it up.

6722. The dust, in fact, would light the fire?—Yes. Then I would say that was dust consumption, due to the work, the mistake being that the person ever went into the work.

6723. Is it not like a case of discussing on which of its legs a three-legged stool stands? What is the relationship between bronchitis and asthma and dust consumption?—Are you speaking of an ordinary person or a person suffering from bronchitis caused by his occupation?

6724. Supposing a person had bronchitis set up by dust, would you be able to schedule him under the head of dust phthisis?—It would be very difficult to prove that the bronchitis was set up by the dust.

6725. But assuming you had succeeded in proving that the bronchitis was set up by dust, could you call that dust phthisis?—No, I should not.

6726. If it was asthma, and asthma set up by dust, and you were satisfied the asthma was set up by dust, would you call that dust phthisis?—Asthma, to my mind, means spasmodic asthma, which comes on in attacks. In these cases asthma is not a form of spasmodic asthma; it is a consistent dyspnoea—difficulty in breathing.

6727. If you were told as a doctor you were to give compensation for dust phthisis, would you put down a man who had got dust asthma under that head?—I would feel inclined to put down that he had asthma or consolidated lung caused by his work.

6728. But you would not include them under one head?—No.

6729. One head would not be sufficient, in your opinion?—No; I think the three headings would be better.

6730. Do you say that these cases are somewhat difficult to distinguish from the point of view of dust

—whether they have been caused by dust or not?—There is a difficulty.

6731. But not an insuperable one?—No, not necessarily so. You might get a mixed case, and then you would be hopeless.

6732. But the hopeless and helpless cases would be few and far between, would they not?—I think so.

6733. So you do not anticipate much difficulty in putting down dust phthisis as a thing which could be compensated for; you do not think it would give the doctors a very difficult task, do you, in the way of distinguishing?—I think sometimes it would be difficult, but sometimes comparatively easy.

6734. You have told us that there are really very few dust cases to be found nowadays?—Yes.

6735. In order to form that opinion you must be pretty clear in your mind that it is easy to distinguish, must you not?—By my constant work amongst the workpeople it might be easy for me, but I am speaking with regard to the general medical practitioner who treats a case. I am afraid, in all sorts of chest diseases, they would certify dust from occupation if they were acting in the interests of their patients.

6736. Do you mean an ordinary practitioner might be in somewhat of a difficulty, but a person who had a real factory experience would not find the same difficulty?—No; there are times when both perhaps would be puzzled.

6737. But in the main he would be able to do his duty, I suppose?—I think so. I wish to explain that to form a correct diagnosis as to whether the particular chest complaint was caused by dust in the course of the workman's occupation, it is essential that the medical practitioner shall have exact knowledge of the conditions under which the particular workman worked, and in my case I should be assisted in arriving at my diagnosis by such knowledge, whereas the medical practitioner attending the case would have to depend on the statements of the workman, and would be liable in consequence to arrive at an incorrect diagnosis, and one which would have been quite different had the precise conditions under which the workman worked been known to the medical practitioner.

6738. The only two occupations, apparently, that you think dangerous are those of biscuit placers and scourers?—Yes.

6739. I suppose, as to the rest of the pottery work, there are a large number of occupations or processes which could not be described in the least dangerous?—I think so; of course, you mean from dust?

6740. Yes, dust phthisis, bronchitis, or asthma; all three. Then there is a good deal of the trade not engaged in these processes at all, is there?—Yes.

6741. And if we took care, I suppose it would not be difficult to pick out the processes in which those risks occur in the pottery trade?—It would be quite easy to pick them out.

6742. Would you pick them out as being biscuit placers or scourers?—Those would be the two processes.

6743. (*Chairman.*) Do you suggest that in the other processes in the china trade there are no cases at all of lung trouble which have occurred through the employment?—That is so; I do not see how they could occur unless the hygienic conditions are bad—bad ventilation or unclean floors.

6744. (*Mr. Cunynghame.*) China painters would not come under the category?—No.

6745. Do not you think the moulders would—those engaged either at the wheel or in moulding clay? Is there not a great deal of dust about in the drying rooms?—Yes; but the man moulding clay does not go into the drying rooms for any length of time.

6746. But the boys who hand the pieces do?—Yes.

6747. Are you of opinion that the biscuit placers and scourers would really cover the ground?—Yes. There is one other branch I should mention: the old towing, but towing is so absolutely altered to what it used to be. It is done in a different manner; there are fans for towing now. When it was carried on in the old-fashioned way, it was worse than any process, but under the present conditions I doubt if the towers do suffer.

6748. Do you think towers ought to be included?—

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As far as I am concerned, yes; but the danger is far less than it used to be.

6749. (*Dr. Legge.*) Is not there an operation known as flint-knocking?—That comes under biscuit placers, but there, again, Mr. Bernard Moore invented a box which kept away the dust from the worker.

6750. (*Professor Allbutt.*) Would the fact that you are not in practice make any difference to your experience, do you think, or would as many cases of complaint come under your notice still?—Yes, I think so.

6751. Is it not possible that many complaining or ailing persons might escape your notice?—That is so, unless they are in the particular department of scouring, where they cannot escape, because they are examined every month.

6752. Do you think the Committee ought to make some subtraction from your evidence on that account, and that there may be cases of dust disease where the people do not consult you?—Quite so; there may be several.

6753. And there may be medical men in active practice who would be likely to see more cases than you do?—Yes, far more likely, unless they happen to be scourers. Scourers I examine every month, and the moment I have suspicions I examine them in detail. I have a large number of scourers under my supervision compared with other districts.

6754. Is there any undue tendency ordinarily to tuberculous consumption in the potteries amongst potters?—I have no statistics. I do not come across many in the works. I examine a large number of men and women, but I do not come across many cases of phthisis.

6755. Tuberculous consumption is not unduly prevalent amongst potters, you think?—Not at the present time; it used to be terribly so.

6756. Then there is the difficulty as to the different names used. I rather agree with you that the word asthma, although a popular phrase, would be better disused in this connection. You see no objection to the use of the word phthisis, as merely meaning chronic lung disease, but your point is, there is no emaciation; it is rather difficult, is it not, to find a common word which would cover everything?—Yes. My impression is that the dust causes a form of bronchitis.

6757. I want to be clear whether we might use, even in the schedule, such a term as dust phthisis. If I use the words dust phthisis, I do not necessarily infer tubercle. Do you agree with that?—Yes.

6758. Are the potters who are subject to dust inhalation in fixed attitudes?—No.

6759. Do the biscuit placers move about at their work?—More or less, yes.

6760. Does that fix the chest in any rigid position. A grinder, for instance, is in a fixed position, and it has been alleged that in that way he may fix his chest and make it so rigid that he cannot draw a deep inspiration?—I do not think that would apply in any of our particular branches.

6761. Have you seen in your experience of true dust phthisis anything to lead you to suppose that the attitude of the worker had an important bearing?—No.

6762. As regards the diseases you have spoken of, chronic bronchitis as the result of dust, I understand, is simply a later stage of that incipient condition you spoke of, in which the patient does not realise that he is ill at all?—Yes; but with some of these people who have bronchitis, I am speaking of bronchitis without consolidation, is inappreciable to auscultation.

6763. With regard to the presence of tubercle, the Committee have been told by all the witnesses so far that tubercle is apt to appear as an incident in the later stage, even of true dust phthisis. Do you agree?—Quite so; it may appear, but it does not necessarily appear.

6764. Would you agree that if in the later stages tubercle bacilli were found in the sputum it would not necessarily take the case out of the category of dust phthisis?—That is where the difficulty comes in.

6765. Supposing, from your knowledge or information given you, you had arrived at the conclusion that the complaint was dust phthisis, and yet that tubercle bacilli was found in the sputum, would the discovery of these bacilli at a late stage of the disease justify you

in removing it from the category of dust phthisis into that of ordinary tubercular consumption?—Probably not.

6766. There is, however, a very large debatable ground between the two extremes, is there not?—Yes. Such an irritant as dust?—Yes.

6767. A person might have a latent susceptibility which, apart from his work, might never have come out, but which does come out when he is exposed to such an irritant as dust?—Yes.

6768. Is there any undue prevalence of consumption primarily to tubercular among these people?—At the present time I should say not. It used to be so; there used to be a tremendous amount, but there, again, everybody was classed as a potter in the Registrar-General's Returns—a painter, a flint man, a man who worked in the clay—all were potters; any one who died in the place was put down potter, so that the use of the word "potter" put these statistics hopelessly wrong. If the Registrar returns a gilder, a young girl of 17 or 18, as a potter, down the complaint goes as potters' asthma.

6769. Supposing there were a special referee appointed who had given attention to these diseases, and that he was provided with the complete history of every case and the symptoms and signs up to date, might he then in a substantial number of cases come to just conclusions?—I think he would. Do you mean that such a special referee would have a report from the patient's own doctor and the certifying surgeon?

6770. He would have all the information he called for, so far as it was possible to get it. I do not quite see your difficulty about malingering. Do you think the kind of cough which you spoke of would be common also among those who drink too much?—Yes.

6771. So that there might be difficulty there, might there not?—Yes.

6772. But only a preliminary difficulty, I suppose, and easily discounted?—Yes. As was pointed out, a man would not get compensation unless he was unable to work, but he ought to be stopped from that work at the very earliest stage.

6773. (*Chairman.*) A man whom you thought was not really incapacitated from work, but showed preliminary symptoms of lung disease ought, in your opinion, to be suspended, ought he?—Yes, suspended from that class of work.

6774. But then, as a matter of fact, his employer, if he were liable to pay compensation if the man were idle, would in practice give him employment in some other branch which it would be quite safe for him to work in?—He would offer it to him.

6775. Then, the man would not get compensation if he were offered suitable employment, and refused it?—That should be so.

6776. There are many branches of the pottery trade which would be quite safe for a worker who had these preliminary lung symptoms, are there?—Yes, there are other branches.

6777. Would it be possible for an employer, if a particular workman was suspended owing to preliminary lung symptoms, to give him employment in some other branch?—In a factory, I doubt it.

6778. Why?—Because the man has to learn a fresh trade. A man who has been brought up as a placer is a skilled workman, and is getting a good wage. A master can say, "The doctor says you are not fit to go on placing owing to lung trouble, and I offer you another job," but what is that job to be, I cannot suggest one myself.

6779. Do you have cases now in which you suspend men on account of lung troubles?—No.

6780. (*Dr. Legge.*) They are women who do this kind of work, are they not?—Yes.

6781. Do the special rules empower you to suspend a woman who is suffering or is likely to suffer from chest trouble during employment?—I do not think it says, "Likely to suffer" in the Act; it is, "If they suffer."

6782. Do you, as a matter of fact, suspend any women on that ground?—I have not the last year. I did one the year before, I think. I have suspended one or two temporarily with bad bronchial colds and difficulty of breathing, but I have seen them again, and they have been all right, and it has been a temporary thing. I have not suspended any for dust phthisis.

6783. For how long a period have you suspended any one?—I do not know when the Act first came into force, but I have suspended them for bronchial troubles.

6784. Since 1898, I think, you have examined them?—Yes, I have.

6785. (*Chairman.*) Do you consider that there are any workers now at work who, while it would not be right to suspend them, do incur some risk of contracting lung disease?—Yes, there are.

6786. If those workers could claim compensation under the Workmen's Compensation Act, would the certifying surgeon in some instances be more ready to issue certificates of suspension?—I should myself, but I cannot send a man or a woman to the workhouse if I can help it.

6787. (*Professor Allbutt.*) It would not be difficult, would it, to distinguish those cases from malingeringers?—I think it would be troublesome at times. You see, if they know that if they went to the doctor and said, "My cough is beginning to get worse, I am beginning to get restless and cannot sleep at night," and you examine them and find the bronchial condition, you could not do anything else but suspend them. Of course, temporary suspension might meet the case in some cases, but I am certain there would be trouble.

6788. (*Dr. Legge.*) Do I gather from you if a person was found to be undoubtedly suffering from potters' asthma, they should be permanently suspended?—Yes.

6789. So that it would not be a temporary suspension from this work, but a permanent suspension?—Yes, but one ought to have the power to temporarily suspend, because a person suffering from a bronchial cold is not fit to work in dust.

6790. (*Professor Allbutt.*) Would you be in favour of suspension for the sake of diagnosis?—Yes.

6791. (*Dr. Legge.*) Do you think that apart from the gradual onset of this disease the dust in potteries can actually set up acute bronchial catarrh?—I do not in potteries.

6792. Under those circumstances, do you see how a temporary suspension could be of any use. If acute bronchial catarrh cannot be set up by dust, although suspension may be desirable, do you see how compensation could be refused?—I do not see how you could give compensation for that; if they present themselves suffering from a bronchial cold, I do not see, though you suspend them, that they ought to have compensation for something caught outside the works.

6793. You say, I understand, that the disease, once started, is almost certain to progress?—Yes.

6794. But that is only if they continue at work, I suppose?—Exactly. If you take them out early enough there is hope, but if you allow them to go on and allow a fibrous condition to ensue, then, I think, it will progress.

6795. Do you know of any case in the potteries where there has been a suspicion of a fibroid condition, and upon ceasing work there has been permanent improvement?—No, I do not know of a case. I heard of such a case the other day, but the person was dead and buried, and I could not investigate it.

6796. Is it your opinion that a person's life would be considerably prolonged by cessation from this work?—Yes.

6797. (*Professor Allbutt.*) Even with things as they are?—Yes, if taken at the early stages.

6798. (*Dr. Legge.*) You examine, do you not, something like 95 per cent. of all the china scourers in this district?—I could not tell you how many scourers there are.

6799. The china industry is confined practically to Longton, Fenton and Stoke, is it not?—I do not know other factories outside.

6800. If there were many you would know of them, would you not?—I have no means of knowing.

6801. I mean from general knowledge?—I do not know anything about the outside districts of Burslem and Tunstall. If you were to ask me what sort of manufactories there are I could not tell you, except that I have always heard it stated I see more scourers than anywhere else in this district.

6802. If I were to tell you that none of the other

certifying surgeons saw more than 20 or 30 scourers, what would you say?—I did not know it.

6803. Is Longton the principal centre for china works?—Yes.

6804. Do you know this report on the incidence of 18 Feb. 1907. phthisis and respiratory diseases on female china scourers in Longton, in which the death rate given for 1896 for the total population is 4.261, and among china scourers 75; in 1897, 4.640 and 68.965 respectively; and in 1898, 5.492 and 75?—I have not seen the report before.

6805. Would your evidence go to show that such a condition of things as that existed now?—I do not think it does exist now, and there are other things to be taken into consideration as regards the scourers.

6806. If this death rate was going on in the years 1896, 1897, and 1898, how can it be so suddenly improved by the provision of fans, because the pre-existing conditions must have affected the workers, and if the disease were a progressive one, as you say, and they continued at the work, one would expect to find increased mortality; can you give us any reason?—No. The conditions under which the scourers work is greatly improved—by means of fans, etc.

6807. These china scourers drop out of employment, I suppose?—Yes.

6808. Do you inquire into that?—Yes, I always inquire if I miss one.

6809. Have you any evidence on that point?—No, I have known one or two die.

6810. You referred to an investigation made by Dr. Ritchie. Did he examine the china scourers and biscuit placers?—No, the china scourers.

6811. With a view to the condition of their lungs?—He had them into the place and examined them himself, and there were one or two things he called my attention to.

6812. Did he examine to see whether there were tubercle bacilli in the sputum?—No, not while he was with me.

6813. You never heard whether he found tubercle bacilli, did you?—No; I was asked to collect some suspicious cases for him, and I gave him all the cases in which the word "cough" was written opposite the name in my books.

6814. Do you say the symptoms which are described as typical of phthisis are the same as those of potters' asthma, I mean as regards the absence of high temperature and absence of night sweats?—You do not get them in so-called potters' asthma unless you get consumption in the background.

6815. Do you find that condition existing, even with tubercle bacilli present?—I have not seen a case of the sort that I could put my hand on or recall to my memory lately. I saw them at the infirmary years ago.

6816. Were those cases of definite tubercular infection on the top of a fibroid condition without high temperature or fluctuating temperature?—But I think you would get high temperature if you had a tuberculous condition. I cannot answer your question definitely.

6817. (*Chairman.*) Can you give the Committee any information about eczema in colour blowing?—I saw three cases, I think about a year ago, and they were the first I saw, and I came to the conclusion that it was not from the colour or dust, but from some turpentine substitute or cheap turpentine the workers were using.

6818. Is the use of this turpentine new?—The use of this particular class of turpentine was quite new to me. I wrote to Dr. Legge and pointed the cases out to him, and he came and saw them. I do not think they had anything to do with the colour.

6819. Is the eczema bad enough to incapacitate the person from working?—Yes, the hands split all open like an extremely badly chapped hand with deep gashes, and they are a shocking sight.

6820. How long does it take a person to recover from it?—Some weeks.

6821. In the meantime what do they do?—They do other work. These persons put ointment on the hands, wore gloves, and did some other work about the place. I suspended them from doing the particular work they were engaged in.

Mr. J. F. Arledge,
L.R.C.P.,
L.R.C.S.

- Mr. J. F. Arlidge,*
L.R.C.P.,
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6822. (*Mr. Cunynghame.*) Was that in the case of one or two firms only, or a lot?—Only two firms.
6823. Is not that rather a disease due to some firm using an improper ingredient on a particular occasion, and not an industrial disease?—That is so. I was told the reason they were using it was that it was cheaper.
6824. Do you know what it was?—No, I know nothing about it.
6825. (*Dr. Legge.*) In some of the cases you have seen the symptoms have lasted a year, have they not?—Do you mean amongst the scourers?
6826. I mean this eczema?—No, the cases I have in my mind now got well in a month or so.
6827. (*Mr. Cunynghame.*) Did the firms still continue to use the stuff?—No; at least I could not tell you they are not using it, but I have had no more

Mr. A. M. McALDOWIE, M.D., called and examined.

- Mr. A. M. McAlDowie,*
M.D.
6832. (*Chairman.*) Have you been for a number of years in practice in the pottery district?—For about thirty years.
6833. Have you been also resident physician to the North Staffordshire Infirmary?—Yes, for about three and a half years.
6834. Are you still physician there?—I am consulting physician. I have also been honorary physician for seventeen years.
6835. Have you held public appointments as medical officer of health?—Yes, deputy and parish medical officer for eleven years from 1880 to 1891 at Stoke-on-Trent.
6836. For twenty-six years have you been medical officer to the North Staffordshire Provident Institution?—I have; that is the largest friendly society in the district.
6837. So that you have had a very wide and long experience of diseases from which pottery workers suffer, have you not?—I have.
6838. Do you consider that any form of asthma, bronchitis, or lung trouble is specially prevalent amongst this class of workers?—Undoubtedly, and due to their occupation.
6839. How would you describe these ailments from which they suffer? How would you name them?—Technically fibroid disease of the lungs; locally it is known as potters' asthma or potters' rot.
6840. Is there also any special form of bronchitis from which they suffer?—In the initial stages there is bronchitis.
6841. Is it due to dust?—It is due to dust.
6842. Does this disease appear only amongst workers engaged in certain processes in the potteries?—Yes, in the dusty processes.
6843. Which processes are those?—There are the throwers in clay, the hollow-ware pressers, the flat pressers, and the turners—that is, the cleaners of the ware.
6844. Are those the scourers?—No; the scourers come afterwards.
6845. Are they liable to these diseases?—Yes, most of all; after the stuff has been fired once, and it injures them more.
6846. And the biscuit placers?—And the biscuit placers, yes.
6847. Is it, in your opinion, easy or possible to diagnose the forms of lung disease which are due to dust and differentiate them from lung diseases which are due to other causes?—In the early stages it would be rather difficult. A typical case would be easily diagnosed, but there are certain cases in which it would be difficult to differentiate and say how much was due to dust and how much was due to ordinary catarrh.
6848. Do you consider that an expert medical man, who had had long experience of these diseases, would be able to say in any given case, if he knew its history, whether the disease was or was not due to the employment?—Yes; I think I myself could tell in any case whether it was due to dust or to ordinary disease, and

- cases lately. One case was at Fenton and the other at Longton.
6828. (*Dr. Legge.*) Would there be any difficulty in showing that the eczema was due to the occupation?—I do not think it was due to the occupation as blower (that is the colour), but to turpentine substitute.
6829. But it was due to one of the materials that was being used?—Yes.
6830. Would it be difficult then for them to prove that it was due to the occupation?—Naturally they could easily prove it was due to the turpentine substitute, because as soon as they were taken away from that particular stuff they got better—that is, a different form of turpentine was used or water.
6831. Have you come across any cases of eczema amongst fritters, or heard of them, due to fine dust?—No, I do not think so among fritters. Fritting is only done once in six months, or once in a year; at many of the factories they do not frit at all.
- any medical man who has been some time in the potteries could tell.
6849. What would you say were the symptoms that differentiated the forms of disease due to dust from those due to other causes?—The special symptom is that the breathlessness is out of all proportion to the amount of cough and the amount of tissue destruction which you get by physical signs.
6850. Do you mean the breathlessness is much greater?—Yes, much greater.
6851. Are there any other symptoms which would enable you to distinguish?—From the anæmia which is invariably present, and the physical aspect of the man, you can see that he has been in a hot and dusty atmosphere for some time.
6852. (*Professor Allbutt.*) Will you amplify that a little?—Especially anæmia, and also the signs on his hands of his occupation.
6853. (*Chairman.*) Do you consider there are many potters now at work who are suffering from the initial stages of these diseases, and who ought, in their own interests, really to be kept away from it?—All potters suffer more or less from the dust, or those engaged in those particular processes I have named. The later stage of the disease is this: We get signs of malnutrition and signs of constriction of the bronchial tubes from the disease having progressed. Then we get black spit, which is due to the dust and the breaking down of the lung, and in some cases, which are rare now, we get dulness on percussion over the back of the lung. Those are the signs of the actual disease when it has been confirmed.
6854. Do you come across many cases at the present time of workers in an advanced stage of the disease?—The disease is getting now of a much less virulent type; it has entirely changed its type during the last ten or fifteen years. We used to have huge masses of hard or condensed lung, and practically the upper half of both lungs would be quite destroyed. Now it is getting more diffused and not so concentrated.
6855. But you still get cases of the disease, do you?—We get cases of more general fibroid condition, not so concentrated, but diffused through the whole organ.
6856. Do you get many such cases?—Yes, practically every old potter has fibroid lung to a certain extent.
6857. Do you attribute that to the conditions under which they are working now or to the conditions under which they were working earlier in life?—The conditions at present.
6858. So that you think any young worker going into the trade now when he gets old would be liable to fibrosis of the lung, do you?—Yes, he will get a certain amount of fibroid lung from the dust and hot atmosphere.
6859. Would that amount of fibrosis incapacitate them from working?—No; they could go on for many years—until after middle age.
6860. And might even die of old age?—And might even die of old age.
6861. Do you get many cases now which go to a further and graver stage of the disease?—No, I think

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that is practically stopped; the conditions which we used to get twenty years ago I have not seen lately.

6862. So you do not come across any cases now of men prevented from working from fibrosis of the lung?—They are prevented from working, but it is not of such a virulent type.

6863. But still they are prevented from working, are they?—When they get old.

6864. Are they prevented by the weakness that comes from old age, combined with the fibrosis, or is it the fibrosis that is the real cause of their incapacity?—It is principally old age, but they are not a long-lived race; working in the hot shops and working in dust combined makes them short-lived.

6865. Do you consider that fibrosis of the lung is contracted to a greater degree by persons who suffer from constitutional weakness or people given to intemperance?—No.

6866. Do you consider the dust is a cause in itself?—It is a cause in itself.

6867. Do you think that a worker who is given to alcoholism is any more susceptible than any other worker?—Not to be attacked by it. Of course, if he was attacked by it he would succumb very rapidly, and probably get tuberculosis and pneumonia more quickly, but an intemperate man, or one with phthisical tendency, would not contract the disease more readily than another.

6868. Do I understand you to say that there are a very large proportion of the men engaged in these processes who are at work although they have a certain degree of fibrosis of the lung?—Yes, a great many.

6869. If fibrosis of the lung were made a subject of compensation under the Workmen's Compensation Act, do you think it likely that these men, or any of them, would declare themselves to be incapacitated from working and claim compensation?—I think so. I think many work now who probably, if they had compensation in addition to their club money, would remain at home; but I may say that the men now go to work with very advanced lung disease, and they seem to like to go to work. It is an interesting work; the shop is warm, and they are more comfortable there than they are at home. My experience has been, in many cases which I have wanted to keep at home in inclement weather, that they prefer to go to work, and I have allowed them to do it, because it does not shorten their lives, and they are more comfortable than at home. Of course, some, if receiving additional compensation, would leave off work sooner than they do now.

6870. You say it does not shorten their lives, but if at a comparatively early stage they were taken away from the process and put to some other work, would not the lung trouble be arrested and their lives be lengthened?—It would be arrested, but it would still be there; it is incurable, once the tissue is in a fibroid condition or does not heal.

6871. If a worker is engaged in a dangerous process, does not the fibrosis get worse and worse as the years go on?—Yes; but if the fibrosis was there it would also get worse and worse with advancing age.

6872. Supposing you have two men aged 40, both with some symptoms of fibrosis, both engaged in china scouring, but one of them remained a china scourer and the other became a farmer, would you say that the probabilities are, taking it hypothetically, that they would both die at the same time, or that the farmer would live longer?—I think, if I were a china scourer, I would remain at my work. I think if you were to make him a farmer he would probably succumb to some other lung disease. I think one would live as long as the other. The farmer would probably contract bronchitis, as he could not stand cold, because he has been accustomed to a confined hot place.

6873. Suppose he were put into some other branch of the pottery trade, in which there is no dust, would you say that his fibrosis would progress at the same rate as that of a man who remained a china scourer?—Perhaps it would not, but practically a doctor would find fibrosis in every potter after the age of 40, and it would be difficult to find other employment.

6874. But not enough fibrosis to incapacitate him?—Not enough to incapacitate him.

6875. (Mr. Cunynghame.) Apparently you do not seem to think that the amount of phthisis is very bad

amongst potters at present?—Not tuberculosis, but fibrosis.

6876. There is a good deal of it about, but it does not seem to be a very formidable disease at present, I gather from your evidence?—Not so bad as it was; it is less from year to year with improved processes for taking away dust.

6877. If the course of the disease and occupation is as you have described it, where does the compensation or the right to compensation come in? Of course, compensation is not for catching the disease; compensation is for preventing a man earning wages. From that point of view, where does the compensation come in? You are not compensating a man for being ill or uncomfortable, but for loss of power to earn wages; and, supposing you put it from that point of view, where does it come in?—During the last few years of a potter's life, after middle age, in the winter time he is usually laid up in inclement weather for some weeks, then he is better in the summer and goes back to work; after that he gets worse and gives up altogether.

6878. So that it is partial incapacity during the later years of a man's life—that is where the incapacity to earn wages comes in, is it?—Yes.

6879. You said something about being in hot rooms. Do you find people are incapacitated who are not engaged in trades which are dusty trades, as well as those who are? Do you find that people who are not engaged in dusty occupations also have the incapacity of which you speak during their later years, especially in the winter?—They get bronchitis also, but not in that special fibroid form.

6880. But are they equally incapacitated?—They do get incapacitated.

6881. Even without the dust?—Even without the dust.

6882. Do you put that down to the heat of the rooms in which they are employed?—Yes, and also to the hot rooms at home; living in a hot room during the day, they have huge fires in their houses at home, and keep the windows shut; they seem to be afraid of fresh air.

6883. So that phthisis, too, is aggravated to a certain extent by the peculiar habits of the men, is it?—That is so.

6884. It makes it difficult to distinguish, does it not?—Yes.

6885. (Professor Allbutt.) But you are prepared, I understand, to distinguish between the two. Supposing a case is referred to you, you would be able to distinguish between a person who had ordinary bronchitis from common causes and a person who had the special form of broncho-pneumonia caused by dust?—Yes.

6886. So that in this sense the difficulty would be less, would it not?—Yes.

6887. Do you think you could judge if a man is incapacitated when he tells you he is?—Yes. Of course, there is a personal element, and what would incapacitate one man would not incapacitate another.

6888. But, generally speaking, you would be able to come to a decision if you were acting as a referee in such a case?—Yes.

6889. As regards recovery on removal from the dust, if a man had been exposed, say, for five years to the dust he would have a certain amount of fibrosis, and there are generally nodules scattered within the lungs, are there not?—Yes.

6890. And you and I may suspect, without knowing it very definitely, that when scattered foci of this kind are established they may slowly increase?—Quite so.

6891. So that if a man goes on five or ten years longer he would have much larger fibrous tracts, would he not?—Yes.

6892. And therefore there would be a much larger area for the deteriorating process to go on in the affected lung?—Yes, it sets up progressive changes from the very first.

6893. A man's prospects must be better in the case of chronic deterioration the fewer the centres of disease, I suppose?—Yes, that is so.

6894. Do you know of any individual man who has

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changed his employment so as to be able to declare how the experiment ended?—No.

6895. You would agree with me, I suppose, the less a man has of the disease the better his chance, and if he has been five years at work the less disease he has than a man who has been 10 or 12 years at work?—Yes.

6896. Has sputum been examined in your experience in these cases?—Yes.

6897. And do you find grit in the sputum?—Yes, and also the colouring matter like blood.

6898. If, in the later stages of the disease of this kind, tubercle supervenes, it does not remove it, does it, from the category of dust disease?—Quite so.

6899. Even although tubercle might spring up later?—Yes.

6900. You would still decide that the case was one of dust phthisis, would you?—Yes.

6901. In your experience of cases of dust phthisis firmly established, and tubercle supervening upon it, does the tubercle make any grave alteration in the man's constitution, or would he be more or less protected by the preceding fibrous process from fever and emaciation?—No; I think the supervention of tubercle is really more rapid in a potter than in an ordinary individual.

6902. It is even a graver thing, is it?—Yes, it is a graver thing.

6903. It is a way in which a man might be carried off, in fact, is it?—It is the way in which they are carried off.

6904. Do you consider that tuberculous phthisis is more prevalent amongst potters than amongst the general public?—I do not think so. I have gone into the question carefully with the Medical Officer of Health, and I find it is not a common kind of disease in the potteries. Staffordshire is one of the three best counties in England in that respect.

6905. Then, you would not expect, if you were a referee, to be embarrassed by an undue proportion of the disease?—No.

6906. (Dr. Legge.) You said that when tubercle supervened, the constitutional symptoms became graver than the ordinary tubercle?—That is my experience. My experience is that they have gone off more rapidly than in the case of an ordinary individual.

6907. But, as regards the precise symptoms present before tubercle supervenes, the temperature has not fluctuated, has it?—No.

6908. When tubercle supervenes, do all those symptoms show themselves?—They do.

6909. In the early stage of working in a dusty occu-

pation do you get acute cases of tuberculosis set up, in your opinion, by the dust?—In a young potter, with tubercular disease, you do not generally find any symptoms.

6910. And, therefore, if a person, say, a biscuit placer, after five years' work, were to die from acute tuberculosis, would you say that that had any connection with his employment?—I should not.

6911. (Chairman.) Have you had your attention called to the statistics of the North Staffordshire Infirmary with reference to the number of cases of potters' asthma?—Yes, some time ago, but not lately.

6912. Do you think that the tabulation of cases under the various heads is made with absolute accuracy, or do you think that there are a certain number of doubtful cases in each category?—The house physician draws up the tables, and as the house physician changes every two years and comes fresh to the district, often for the first few months he is there he would probably not put one down as having potters' asthma, until he had become acquainted with the disease.

6913. If the tables showed a phenomenal decrease in the number of cases of potters' asthma within the last 10 years, should you say that decrease was a real decrease or that it might be merely a "statistical decrease"?—I should say that probably they would have adopted a different term for the same thing—for instance, called it fibrosis, when before it was called potters' asthma.

6914. Cases of potters' asthma, which would very likely have been tabulated 10 years ago under that heading, would now be tabulated as some other form of asthma, or something else, I suppose?—Yes, probably fibrosis.

6915. They would not be likely to be mixed up with the cases of ordinary asthma?—No.

6916. (Professor Allbutt.) You said that from your experience you could generally decide fairly when a man was incapacitated from work or not, and you say in your précis: "After middle life practically every operative in a dusty process has sufficient fibroid changes in the lungs to enable him to claim compensation." But if he claimed compensation he would come under someone like yourself, for instance, who has had experience in these cases, I suppose?—I omitted to say unless some standard was adopted there would be some variations from the ordinary type of potters' asthma, but it would not be sufficient to incapacitate him.

6917. A physician of your experience would not find much difficulty in distinguishing between the cases, would he?—No.

Mr. WILLIAM BURTON, called and examined.

Mr. W.
Burton.

6918. (Chairman.) Are you attending here as the representative of the Pottery Manufacturers' Association?—That is so.

6919. Are you able to give the Committee evidence on the question of potters' asthma?—Yes.

6920. Have you been connected with the pottery industry for a great many years?—For 20 years.

6921. Do you find during that period that the disease has changed in prevalence?—Undoubtedly, that is my firm impression. When I first went to Wedgwood's, 20 years ago, a very old-established place, where families have worked generation after generation, and where one finds consequently the sort of evidence you cannot find elsewhere—the old men spoke a great deal about potters' asthma, but said then how much less prevalent it was than when they were young—and as I have seen fresh generations come on I have seen singularly less potters' asthma, speaking in the broadest sense and in the sense the potters themselves use it when it was not a definite thing, but where every man who had chronic bronchitis or asthma every winter always assumed that what he suffered from was potters' asthma.

6922. Have you noticed any decline in the number of cases within the last 10 years of real potters' asthma?—All the evidence that I have been able to get in the potteries district is very strongly in that direction. I have interviewed practically all the

certifying surgeons and a great many of the club doctors in North Staffordshire, and it is a matter which I have been asked to look after.

6923. (Professor Allbutt.) Are you a potter yourself?—Yes.

6924. In what part of England?—In Lancashire, near Manchester, but I was originally five years with Wedgwood's as their chemist. I have seen several of the large club-doctors in Staffordshire, and they tell me most emphatically, and Dr. Hill, the certifying surgeon at Tunstall, told me again only last week, that the change was most manifest. Dr. Hindle, of Tunstall, says the same thing. The figures I have sent you, which were all I have been able to get from the largest general club in the potteries, the North Staffordshire Provident Association, are in the same direction, and their secretary tells me they have much fewer cases than they used to have. There is also this to be borne in mind, that a great many of these cases might have occurred, and have never been classified as potters' asthma at all. You see in the return of deaths, and so on, drawn up by medical men and reported to the local Medical Officer of Health, there is no special heading for potters' asthma, so that I am afraid these figures must be taken with the very greatest caution.

6925. (Chairman.) Cases do sometimes occur, I suppose, of real "potters' asthma"?—I think there can

be no doubt that a certain amount of suffering and disease of consolidated lung has arisen in the past, certainly, and still arises. I had the worst evidence of that, because one of my own men, who never worked on any other pottery works, has just died from it.

6926. Do you think it is easy to differentiate "potters' asthma" from other forms of lung trouble?—That, of course, is a pure medical question, and I can only answer by stating what I have been told by the medical men in the Potteries, who say that in their opinion it is exceedingly difficult to differentiate; that, at all events, in the early stages of the disease the symptoms are mainly subjective, as they are in the early stages of lead poisoning, and very largely they have to proceed on the men's or women's own statements. I may say that I have been told by a doctor that he never knew a case of potters' asthma among women operatives.

6927. Have the Pottery Manufacturers' Association any opinion to place before this Committee as to the desirability, or the opposite, of scheduling "potters' asthma" among the diseases under the Workmen's Compensation Act?—Yes, they have a very strong opinion in this direction; that what is undoubtedly potters' asthma is, in the first place, a gradually and rapidly diminishing quantity, in consequence of the better regulation of factories and processes for the better removal of dust. In the next place, as we are advised by the best medical men we can get in our own district, who know the circumstances of the work, it is exceedingly difficult indeed, if not impossible, for them to differentiate potters' asthma until it has reached a certain stage, from the ordinary forms of lung trouble, which are more than usually frequent in that district, because it is a clay subsoil district, and lung diseases are said to be more than usually prevalent there. Then, there is this great difficulty which we foresee. If you decide that compensation ought to be granted in these cases—and we cannot deny and have no wish to deny that there may be branches of the industry in which mischief has been and may be done by the inhalation of dust—that being granted, we say, if you decide to give compensation at all, it ought to be given under the most stringent regulations, for the reason that everybody who works on a pottery is not a potter. We have, for instance, on our own works 100 different occupations, and on a works like Minton's or Doulton's, where they manufacture a greater variety of goods than we do, they probably have even more occupations than we have. You will remember that in the case of plumbism or lead poisoning it was found absolutely imperative to limit the people who might be allowed to even claim compensation, on the ground that there were so many occupations connected with the industry from which plumbism could not possibly arise, and if the thing was left generally everybody who had symptoms which might be like those of plumbism would have a claim. There is another thing I should like to say, which is very germane to the point. When first it was proposed by Lord James that pottery manufacturers should compensate for plumbism, I pointed out that one result which was certain to follow would be an increase in the number of cases. I am convinced that a quarter of the cases we have on our books to-day, that we are compensating on account of alleged plumbism, are probably not due to the occupation at all, only the medical man is in difficulty that, as the people work in an industry in which lead is employed, he cannot definitely say, and therefore errs on the side of helping the weaker person, and grants compensation. I think that is a point which ought to be strongly borne in mind in dealing with compensation for an industrial disease, unless the industrial disease is one which can certainly be most clearly differentiated from any other ailment.

6928. You said it was difficult to differentiate until the disease had reached an advanced stage, did you?—So we are advised.

6929. But a workman would not be incapacitated from work or be liable to be suspended from work quite in the initial stages, I suppose?—I presume not. I look upon this as a very different thing from the question of plumbism, which we are dealing with more or less satisfactorily. The number of workpeople involved, even if you grant a schedule, would be very much relatively larger than those scheduled for plumbism. We have calculated that probably three and a half times the number of workpeople are employed in the clay branches as compared with the scheduled lead processes, and even if we

drew up a schedule, with the utmost care, and restricted it to those occupations where there might be risk, there would be roughly 20,000 people in the country, and to have a monthly medical examination of 20,000 people would simply paralyse our work. Assuming there was any suggestion on anybody's part that there should be a regular examination of the workpeople, we should be compelled to oppose that as impossible.

6930. On the point of suspension, I would point out that the question of scheduling of a disease under the Workmen's Compensation Act does not necessarily involve any change in the rules of the Factories Act under which suspensions take place?—Not necessarily.

6931. It is a question wholly apart?—Quite so; no special rules, no power of suspension.

6932. But there may be compensation for a disease with regard to which there is no power of suspension, and, therefore, no medical examination?—Quite so. Under the regulations with regard to plumbism a surgeon has power to suspend, if he considers there is danger to the person from working longer in that occupation. Would you propose to give the same power to a surgeon to say a person ought not to work in this particular occupation, because the lungs are already so much affected that they would be much more liable to suffer?

6933. That is a question wholly apart from workmen's compensation. It may be desirable or not, but it must be considered quite apart from this question. —Yes, but that is a matter which we must naturally have before our eyes.

6934. The examination does now only apply to the china scourer, does it not?—Unless you put in some fresh special rule.

6935. A fresh special rule under the Factory Acts, not under the Workmen's Compensation Act?—Quite so.

6936. You suggest, do you, that if it were decided to schedule potters' asthma, that in any case the occupations of the workers who are liable to potters' asthma should be selected and clearly stated?—I think that is most important.

6937. Which occupations do you consider those in which cases of potters' asthma may arise?—That is a question on which I should hardly care to give a decided answer now. I think that would be a question in which we might all—say, Dr. Legge, representing the Home Office, and someone representing the men and manufacturers—discuss the whole thing. We have roughly formed an idea, as manufacturers, but we have not yet been able to come to any definite conclusion—it is a very large question. One would rather have to go by the process of exclusion. The operatives asked us to include all operative potters, but that would not do, because that would exclude certain people who are even more liable to suffer than operative potters, such, for instance, as china scourers and china-biscuit placers. I might mention those two typical occupations, which no one can deny involve a grave element of danger. With regard to the operative potters, I cannot conceive that a turner or a thrower or a handler or a looker-over of green ware before it goes into the oven could by any possibility contract an industrial disease.

6938. (*Professor Allbutt.*) What would you call an operative potter?—One who actually makes a vessel of clay, or his attendant. But, then, you see the operative potters and their attendants do not comprise a fifth of our workpeople.

6939. Is "operative potter" a technical term?—I do not think it is a technical term, but I think it is understood what we mean. It would include all people who make vessels either by pressing or casting or throwing or turning and their attendants.

6940. (*Chairman.*) Is there anything you would like to say to the Committee with regard to the effect on the workpeople now engaged in the industry of scheduling this disease?—That is a very important matter indeed, and one which we feel most acutely, because what are we to do if this disease is going to be scheduled with the people at present in our employment, who might conceivably, as soon as the Act became law, come upon us for compensation? The singular part of it is that we are going to be penalised if you are going to give compensation for the misdeeds of the past 20 or 30 years. In this particular case it

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would be a case of retrospective legislation. You see, a man has only to go on with his occupation in order to get compensation.

6941. (*Professor Albutt.*) That is, assuming the dust has caused the disease?—I am bound to assume that, and that again is a very big question for the manufacturer, because, after all, taking the old men, many of whom, if examined now, would be certified by any medical man to be injured by their occupation, some of them are the most skilful workmen we possess and are not incapacitated.

6942. (*Chairman.*) Therefore, they could not claim compensation, unless they were not merely suffering from a disease, but were incapacitated?—But when you give a right to a man to claim he is incapacitated from work, he would soon get into the habit of claiming it. The medical men tell me that, with regard to plumbism, one of the worst things compensation for plumbism has done has been to convert an optimistic race into a pessimistic one. Whatever anyone suffers from who works in lead, now, it is always the lead which is said to be the cause, and so it would be here.

6943. (*Professor Albutt.*) How far a man is incapacitated from work would be a medical question, would it not?—Yes, I presume it would.

6944. And in the light of the evidence we have had, I understand medical men would not shrink from giving a decision on the question?—There are certain medical men who shrink from giving any actual decision. There are others, of course, who hold most extreme views. There is a well-known doctor in the Potteries, who said the other day that the presence of a blue line on the gum was an absolute proof of lead poisoning, and the same doctor has stated that no one could work in the Potteries without suffering from the dust they must inhale.

6945. (*Dr. Legge.*) Do you know how the schedule is arranged, and that on one side is put the name of the disease for which compensation is claimed, and on the other the particular process?—Yes.

6946. If you had on this one side, "fibrosis of the lungs," and nothing else, it would then devolve on the worker to prove, would it not, that he had contracted the disease from his employment. It would not be assumed that it arose from his employment, seeing that nothing is written on the right-hand side. Would you take exception to a schedule framed in that way, leaving it to the worker to prove he had contracted the disease from his employment?—I realise that there are a whole group of industries going to be affected by this legislation; it is not confined to our trade, and what might be wrong for our trade might be right for the majority. Personally, I

see no objection to that course being taken, except that there would be serious litigation and trouble between operatives and masters for a time.

6947. Even supposing you had a long list of occupations in the Potteries, and it was placed on this left-hand side, it would be possible still, would it not, to compel the worker to give proof? Is it therefore desirable to go into the classification or description of process?—I think so, for this reason: That unless you could prove that the majority of the occupations in the industry could set up this condition, then I think it is very much better to proceed by a process of exclusion.

6948. Do you mean that what was put on this right hand side would be a guide?—I think it would be a very great guide, and it would settle people's mind on one side and the other. Of course, if it were held, or could be shown, that it was a general condition, or that it extended to the majority of occupations in an industry, I think the balance of the advantage would be with your view, by making it perfectly general; but if it could be shown, on the contrary, that whatever difficulty there is exists only as to certain fairly well-defined or definable occupations, then I think it is to everyone's advantage to have those scheduled. The clause in the Bill giving the Home Secretary power to schedule these occupations, says he may do it in any way he pleases, so that the hands of the Home Office are perfectly free in the matter.

6949. You hesitate with regard to mentioning particular processes, but would it be necessary to go much further than to name china scouring and biscuit placing?—I think that would not satisfy the men.

6950. Do you mean they would like more?—Naturally. I am not going to suggest for a moment, on behalf of the trade, that if there is serious damage being done the trade ought not at once to meet the point, but I think we must know exactly where we are.

6951. You said, did you not, you believe there is a very great diminution in the number of cases of fibroid phthisis?—I think so, from all the evidence we can get and all the knowledge we have.

6952. And it seems to be exceedingly pronounced among china scourers, for instance, owing to the provision of fans?—I understand that has diminished the disease amongst china scourers.

6953. But in the case of the biscuit placer there has been nothing done to improve the conditions, has there?—I think so; but, with reference to china biscuit placers, I suggest you would question Mr. Moore, who can speak specially about the china part of our industry.

Mr. BERNARD MOORE, called and examined.

Mr. B. Moore. 6954. (*Chairman.*) Have you been for many years a pottery manufacturer at Stoke-on-Trent?—Yes, at Stoke-on-Trent and Longton.

6955. You have heard, have you, the greater part of Mr. Burton's evidence on this subject?—Yes.

6956. Is there anything in general you would like to add to what he has said with reference to potters' asthma?—Nothing, except this: Women who work as china scourers have suffered in the past, but I have hardly ever known a woman clay worker to suffer; the cases have been extremely rare.

6957-64. Do you think there is anything in the sex which makes people more liable?—No; but I think a great deal of potters' asthma in the past has been due to the employment of young boys as jigger turners. Thirty or forty years ago, I can remember that if a boy wanted to be a working potter, unless his family were in a very good position, he always commenced as a jigger turner at 8 or 9 years of age, working in a dusty place, and sometimes all night, and he laid the foundation of the disease, and my experience is that that has been one of the most fruitful sources of the trouble. After being a jigger turner he became afterwards an ordinary potter, and almost always showed signs of shortness of breath. That is a thing you do not see now.

6965. Therefore the younger men who have come into the trade of recent years are not so likely to suffer, are they?—No; my experience is that it is an almost disappearing disease.

6966. Do you think the disease can be distinguished

from other lung complaints?—I do not, and that is my chief objection to this proposal. I think, in almost every case of bronchitis and phthisis and general chest trouble, it is extremely difficult to say that it has not been helped in some way. No doctor could say it has not been accelerated by the employment, and there are very few cases of potters' asthma which are not complicated by other diseases. What I fear most in connection with the proposal is that every case of chest trouble will be made a means of attempting to connect it with the man's trade.

6967. Do you know that the Workmen's Compensation Act provides that cases of this kind shall first be considered by a certified surgeon, and that there is an appeal from him to a medical referee, who, of course, would be an expert in the particular disease that was brought before him for examination? Do not you think that provides sufficient machinery for discriminating?—I do not. What I fear is that every old man will be thrown out of employment. After a certain age more people die of chest trouble than of anything else, and chest troubles are very prevalent in the Potteries. I do not think that any manufacturer will take the risk of employing old people, and there will certainly be an enormous number thrown out of employment at once. Manufacturers, to my knowledge, and I am consulting many of the leading firms in the Potteries, are having their men examined with a view to this lung trouble. Every man is being examined at three large factories I know of.

6968. (*Dr. Legge.*) Will you describe the class of

worker who is most exposed, in your opinion, to disease?—The china biscuit placer.

6969. Does the china biscuit placer also do the flat-knocking and the flint sifting?—No, not necessarily. The flat-knocker is, as a rule, a casual man.

6970. Does he do nothing else but flat-knocking?—He is an oven drawer in many cases; he takes his turn doing the other work. He may do flat-knocking on one day and draw the oven another day.

6971. Is that necessarily a dusty occupation? Must he inhale dust?—No; if they carried out a plan suggested to them I do not think flat-knocking is as bad as it used to be, though it will always be a rather dusty occupation. I had a box made, which Mr. Osborne came to see, and I had a plan of it drawn and sent to many manufacturers, and it has been generally adopted in order to do away with the dust. That stopped the bulk of the dust in flat-knocking, but there is a serious difficulty with regard to biscuit placing. You understand, I distinguish very strongly between earthenware biscuit placing and china biscuit placing. There is no dust in earthenware biscuit placing.

6972. So you think that the whole of the earthenware workers might be excluded, do you?—Yes, certainly. You see there is no flint used in placing earthenware. It is very unusual to place earthenware in flint, although I believe, for the making of a vitreous body, in one or two places they have adopted the china system of placing, which is to put a layer of flint between the plates.

6973. In earthenware it is usual to use sand, is it?—Yes, and the sand is 20 times as coarse as the flint, and it cannot rise at all. Each particle is almost as large as a small shot, while flint is a fine dust.

6974. In the towing of earthenware, where it is necessary to use fans, what is the constitution of the

dust?—That is a flint dust. The dust that a china biscuit placer inhales is not the dust of the ware, but the dust of the material in which he is placing it. *Mr. B. Moore.*
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6975. Is the dust of the material he is handling moist?—No; in towing it is quite dry. There is no dust given off from the ware in placing.

6976. When you say it is flint, do you mean it is flint like sand, or such flint as you would get as silica?—You have the silica and you have boulder flints—flints you see in the chalk measures and those on the seashore. They form about 30 per cent. of the composition of an earthenware body, so that there is both free flint and flint which is combined with the clay in the earthenware. But the china biscuit placer does not get his dust from the ware; he gets it from the material in which the ware is placed. I should say that I could not choose a more healthy employment, providing the work is not done in a draughty place, than that of an earthenware biscuit placer. I call it one of the least dusty employments, but a china biscuit placer's work is very dusty and very difficult to deal with, because the powder in which he is placing the ware is of a very fine character, and rises easily.

6977. (*Professor Allbutt.*) That is a silicious powder, is it?—Yes, it contains, probably, 98 per cent. of silica, and the particles would be sharp.

6978. (*Dr. Legge.*) Would you prefer a definition in the schedule of particular diseases. Assuming a disease like fibrosis of the lungs might arise, to leaving the onus on the worker to prove that he had contracted the disease?—Do you mean am I to choose between one and the other? I would not say so then, but I think it would be fairer to clearly define. I do not think the dust of earthenware and china are equally bad. I think china is worse. Dr. Arlidge makes a mistake in his book when he says it is because china contains more silica than earthenware.

TWENTY-THIRD DAY.

Tuesday, 19th February 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).
Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.
Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. J. W. DAWES, M.B., C.M., called and examined.

6979. (*Chairman.*) Are you a medical man in practice in the Potteries?—Yes.

6980. Have you had a large general practice there for a number of years?—Yes.

6981. Are you also Medical Officer of Health for the town of Longton?—Yes.

6982. In which there are large china and earthenware works?—Yes.

6983. Have you had large experience of potters and their diseases?—Yes.

6984. Have you had many cases of so-called potter's asthma under your care?—Yes, a fair number; I would not say very many.

6985. What are the preliminary symptoms of that disease?—Cough, shortness of breath, and expectoration, and a certain amount of flattening of the chest takes place, and emaciation is one of the points in the later stages.

6986. Are those the main symptoms?—Those are the external signs. Then, with the stethoscope and percussion, you find wheezing and râles, and a certain

amount of dulness here and there, which may be excessive in some parts.

6987. Do you think it possible to diagnose the disease with certainty?—That is a difficulty, I am I should not think it is a matter for certain diagnosis at all.

6988. I suppose there is a very large proportion of cases in which it might be said with a considerable amount of certainty that the man was suffering from lung disease owing to his employment?—Yes, I should say that.

6989. Would there be a certain margin of cases in which there is doubt whether the lung disease was constitutional or caused from the trade in which the man was engaged?—Yes.

6990. With regard to those latter cases, do you think that a really expert medical man, who had made this special subject his study, could say as a rule whether the process in which the man was engaged was the *causa causans* of the disease?—That is a difficult point, to my mind, but I should think it would be possible for an expert to define it.

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6991. You have no statistics, have you, as to the degree of incidence of this disease?—No, I have not.

6992. You have furnished some statistics of deaths in Longton, have you not?—Yes.

6993. What is the main purport of these figures?—I brought them, thinking they might possibly be of service, as I had not any others.

6994. Do they show the deaths from respiratory diseases from 1898 to 1906?—I pick them out in this manner: Each one of these cases represents a potter. The bronchitis, the phthisis, the fibroid phthisis, and potter's asthma cases are all cases of people who do some form of work in the potteries.

6995. You have not the death rate have you, from these diseases among potters as compared with the death rate from similar diseases amongst the rest of the population?—No, I have not.

6996. Could you give those figures?—Yes, I think I could get those figures for the Committee if they require them.

6997. (Mr. Cunynghame.) What is the population of the Borough of Longton?—36,797.

6998. Where are these statistics got from?—From the Registrar's monthly returns.

6999. Are they printed and published?—No, they are returned to me every month as Medical Officer of Health by the local Registrar of Births and Deaths.

7000. In proportion to the population of 36,797, the number of cases of bronchitis is 168 in nine years; must we divide the figure of 168 by nine to get the yearly average?—Yes, of deaths.

7001. So that would give about 19 cases of bronchitis, about 20½ of phthisis, including all sorts of phthisis—tuberculosis of every kind, I suppose, as well as what I may term dust phthisis?—No; if you look you will see another heading of fibroid phthisis.

7002. I do; but I mean the phthisis of which 186 is the number given here, represents all the phthisis cases, does it not?—It does not include the fibroid phthisis.

7003. But it includes cases which would not be dust phthisis, does it not?—Probably.

7004. It includes all the cases of phthisis that occur except fibroid phthisis?—No, I should not say that at all, because if there have been other cases, not amongst potters, I have not included them.

7005. Does the figure 186 represent all the potters who in nine years died of phthisis?—Yes.

7006. Then, taking the classification, 11 represents the total deaths from fibroid phthisis?—Quite so.

7007. To get the yearly average one must, of course, divide those figures, must one not, by nine?—Yes.

7008. So that gives of bronchitis cases 19, of phthisis proper, as I will call it, 20½, of asthma 6½, and of fibroid phthisis an average of 1 and a little over; is that right?—Yes.

7009. Those, as far as I can see, do not strike me as very high figures. They are not very alarming figures, are they?—No, they are not.

7010. Consequently, any compensation that had to be paid would not appear to be a very formidable matter if you divided up amongst all the potters of Longton, does it?—No, I should think not, if only compensation for death alone has to be paid.

7011. Can you give the Committee the number of potters that there are engaged in Longton out of the 36,000 odd population?—Yes, I have it from the census returns; the number is: Males of 10 and upwards, 4,815; and females, 4,559.

7012. Have those figures varied very much in the nine years, the period which your figures cover? May I assume that those figures represent the average for the nine years, or has there been a large change in the numbers?—No, I should think they keep pretty much about the same figure.

7013. With regard to the figures as to potters, do they include the whole of the people engaged in the pottery trade in any way, or are you thinking of some class of potter?—No, the return is of those who work in earthenware, china, and porcelain; it includes the whole.

7014. Would that include a number of people engaged in china painting who would not be likely to catch dust phthisis at all?—Yes.

7015. It is not quite correct to use the words "fibroid phthisis" as exactly relevant to dust phthisis, is it; you might have a fibroid condition in certain cases where there would be no dust, might you not?—Yes, you might.

7016. Can you give any idea of the proportionate number of potters who would be exposed to dust out of those 4,815. Have you sufficient general knowledge of the processes in the pottery trade?—I know what the processes are.

7017. Will you kindly say what processes you consider dangerous from the point of view of liability to dust; you do not consider them all dangerous, I suppose?—Not equally so.

7018. But do you regard them all as partly dangerous?—I should think one might say that all, to a certain extent, would be included in the word "danger."

7019. What danger would there be to the painter?—There is always dust, more or less, in all the rooms, although it is kept down more than it used to be.

7020. Would there be dust in the painting rooms; it would ruin the painting, would it not, if there were?—Yes, but there must be a certain amount of dust taken in by the people themselves.

7021. Then there is dust in the office where they sit and make up the accounts, and even dust in the streets of Longton. Do not you think we should be rather going too far afield if we take notice of every bit of dust that might by every possibility get into a person's lungs?—Perhaps I should say dust arising from the works.

7022. Would it be possible, by naming certain processes, to justify putting down the dangerous processes to which people were exposed in the potter's trade, taking a certain amount of them, and then saying of the rest that they do not seem to be exposed to much more danger than the mass of the population—do you think that would be a fair way of putting it?—Yes, I do.

7023. If that is done, that involves one taking an account of the different processes, does it not, and saying A, B, and C are specially dangerous and D, E, and F are not specially dangerous?—Yes.

7024. Do you think you could give us those classes of the trade which present special dangers?—I think I could.

7025. Will you state what the chief ones are?—The scourers are the chief, and I should think the ovenmen are the next; then probably pressers, lathe treaders, throwers and moulders, warehouse men and women.

7026. Do you think the warehouse people are liable?—Yes; I do not say they are so much liable to it, but they are liable to it.

7027. Do not you include biscuit placers?—Oh, yes, they are the worst.

7028. Are you able to give us any sort of idea of what proportion those occupations would represent of the 9,300 potters, male and female, that there are?—I should think quite two-thirds.

7029. May we take it that with regard to the remaining third, they are not engaged in a more dangerous occupation than those people engaged in a host of other trades?—That is so.

7030. Taking a man who is engaged regularly in driving a coach along a road in a flinty country, I should have thought there would be a good deal of dust blown up on the road, would there not?—Yes.

7031. Would you call that a dangerous trade or not, or have you had any such experience?—No, I have not had that experience.

7032. I should have thought he would be as much exposed to dust as a china painter when you came to consider it, would he not?—Yes.

7033. Supposing it were resolved only to include the trades which you say compose two-thirds of the industry, it could hardly be complained if the one-third were left out, could it? What would be the right thing to do from a medical point of view?—I think it would be very fair to leave out the one-third altogether, as not being exposed specially to the danger of potters' rot.

7034. In the word "asthma," I suppose you include phthisis and asthma and bronchitis, and the whole

thing?—I should do so, but these returns are made separately.

7035. When you speak of potters' rot, would not it include all the group of diseases?—Yes, I should incline to that point of view.

7036. (*Professor Allbutt.*) You mentioned emaciation as one of the first and chief symptoms, did you not?—Yes.

7037. But your mentioning of it first was accidental, was it not? Emaciation is not really a leading symptom?—Yes, it was accidental.

7038. You would agree with the other witnesses that at first it is rather the absence of emaciation which is a peculiar feature of potters' disease?—Yes, I agree; I made a mistake in mentioning emaciation as an early symptom.

7039. You say in your précis, "If these symptoms are associated with daily work in a dusty atmosphere in a manufactory, we may consider it is a case of potters' asthma. But, inasmuch as these symptoms are also common to such diseases as chronic bronchitis, emphysema, and other chronic chest troubles, not necessarily due to dust, but often to carelessness of ventilation in home, in clothing, feeding, and drinking, and yet these being chest diseases which potters suffer from in common with other workers, I can readily foresee, if these diseases are scheduled, very many cases of chronic chest trouble in potters will be diagnosed as potters' asthma, and it will be very difficult, if not impossible, to disprove this." But the referee, to whom in case of difficulty a patient might be referred, would have all the history of the case before him, would he not?—I was thinking of the earlier cases; I was thinking more of the beginning of these cases, not when the disease is thoroughly established.

7040. A case at the beginning would scarcely come under the operation of this Act, would it?—I did not know that.

7041. The point is incapacitation. When the matter comes under consideration as one of incapacitation, the referee would have the advantage of learning the history of the case, would he not?—Yes, certainly.

7042. I quite agree as to the great difficulty of diagnosis on being suddenly consulted; but if you were a referee, and the whole history of the case was laid before you, do you think there would then be much difficulty about the matter?—No; I think it would be very simple then. I had in my head the beginning of the disease rather than the later stages.

7043. You were speaking rather as a medical man than from the point of view of a legal demand for compensation?—Yes.

7044. Then, again, cancrene of the lung is very rare, is it not?—Yes.

7045. With regard to tuberculosis—without leading you, we have heard from many witnesses that in the later stages of dust-lung, tubercle may supervene, and that if it does, the potters' disease from that time assumes a more acute form, with night sweats, emaciation, and fever, as though previous potters' disease had opened the way to tubercle. Is this your experience?—Yes, I quite agree with that.

7046. In other trades it is said that the fibrosis forms a certain protection against the penetration tubercle; but it would depend on the degree, I suppose, of the fibrosis. You find in potters' disease that the supervention of tubercle is a grave matter?—A very grave matter. I had a case a little while ago, the last case I had, in which the patient had no tubercle. I had the sputum examined several times, and was astonished to find no tubercle, and that was an advanced case. I thought the patient would not live very long, but he rallied and is living now, and that was two years ago.

7047. Then you would not be disposed to say that the supervention of tubercle is the usual course, at any rate?—It is not a certain feature.

7048. There are always difficult cases; but, speaking generally, the relation of tubercle to potters' disease would not be a matter of very grave difficulty, then? A person inheriting some susceptibility to consumption may never contract it, but if put to a dusty trade he might well become tuberculous, I suppose?—Yes.

7049. So that there might be a certain theoretical responsibility on the part of those who conduct the trade?—Yes.

7050. And in a case of this kind would you agree that to discriminate dust disease from primary tuberculosis would be almost impossible—that it would be difficult to say how far it was due to the dust and how far to other causes?—Yes.

7051. But if we could establish that the case began as dust disease, then the tubercle becomes, however grave, a secondary complication, does it not?—Yes.

7052. And a disease for which the trade is responsible?—Yes.

7053. But there might be many intermediate cases of this mixed kind which might offer a difficulty to a referee as to whether the tubercle were primary or secondary?—Yes, I should think it would create some difficulty.

7054. Do you think in the majority of cases that the evidence of the precedence of the dust disease might be fairly conclusive?—As to whether that was really the cause of the tubercle or not, do you mean?

7055. How the disease was initiated, whether it was tuberculous in its origin or dust in its origin?—I should be inclined to give the dust as origin.

7056. (*Dr. Legge.*) How many years have you been medical officer of health?—Four years.

7057. So that you do not remember an inquiry that was made into the deaths from phthisis and respiratory diseases of the female population in Longton, and of the china scourers in particular, by two Inspectors of the Factory Department in 1898, although you were in practice then?—No, I do not.

7058. (*Chairman.*) Can you tell me how long it takes for the disease to develop? Suppose a healthy worker were to be engaged in one of those dusty processes, what would be the minimum period of time in which fibrosis of the lung would be at all likely to be contracted?—That is rather a difficult question to answer. You say, "to be contracted," but it is such a very slow process. Do you mean when a man began to be ill, or when you would be certain he had some such disease?

7059. I mean the latter?—Do you mean how long he has been at the work before you were sure he had the disease?

7060. No. If you were sure he had the disease what would be the minimum time he would be likely to have been at the work?—That would vary according to the individual, to a certain extent. If he started a strong, healthy man at the work it would take longer probably, and another thing, if he lived a clean, healthy life, and was not a drinker, he would resist any tendency to the disease longer than another man. He might go 10 years, at least, under those circumstances without showing symptoms of the disease.

7061. Supposing a man were particularly susceptible, and the process in which he was employed was the most dangerous of those you have mentioned, what would be the least time?—Twelve months or two years—not more, I think.

7062. Would you be very much surprised if a worker who had gone into the potteries, and had been working there for six months only, were to show symptoms of this disease?—No, if he was a bad liver I should not be surprised.

7063. Or even a shorter period?—I would not say shorter than six months; I think even if he was a bad liver that he would not show anything earlier.

7064. (*Professor Allbutt.*) Referring to your reply to Mr. Cunynghame, the dust which pervades the potteries is a very fine silicious dust, is it not?—Yes.

7065. The particles of it are sharp and angular?—Yes.

7066. Do you find these particles in the sputum on microscopical examination?—I have not examined for that purpose.

7067. Then you could not say whether, for example in the less dusty departments, these particles are still to be found in the sputum of persons who, perhaps, never show signs of dust disease?—No.

7068. Even in the painting-room—presumably a room which is less dusty—is there much dust lying about on the ledges of the windows and in the corners of the room, and so on?—Not so much as there used to be.

7069. You would not be able to sweep it off the ledges

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of the windows in little heaps, for instance?—Not more than you would in an ordinary house, I should think.

7070. As regards intermediate rooms, is the same thing true—is it only in the dusty rooms where much

dust would be flying about?—Yes, but of course that is kept down more than it used to be, a great deal.

7071. It is very much better than it used to be, is it not?—Yes, a great deal.

Mr. G. PETGRAVE JOHNSON, M.D., D.P.H., called and examined.

Mr. G. P.
Johnson,
M.D., D.P.H.

7072. (Chairman.) You have, I believe, been in practice as a general medical practitioner at Stoke-on-Trent for a number of years?—Yes, between 12 and 13 years.

7073. Have you made a special study of the question of the incidence of lung diseases amongst potters?—I have to some extent. I went into the matter some years ago.

7074. Is it your opinion that the lung diseases which are due to employment can be differentiated by diagnosis from those that are prevalent amongst the ordinary population not engaged in pottery occupations?—I do not think so; I do not think it can. The way in which we come to the conclusion that it is potters' asthma, as a rule, is by inquiring about their employment. When we know the occupation, then we suspect that the bronchitis from which the man is suffering might be secondary to dust irritation.

7075. Do you think there are any specific symptoms that attach to asthma or fibrosis of the lung that are caused by dust different to those attaching to diseases of the respiratory system which are not caused by dust?—I do not think it is possible to distinguish for practical purposes. It is a disease which develops very slowly, like an ordinary bronchitis; it takes years to develop, and any attack of bronchitis in a potter could be put down to potters' asthma, or what is usually termed potters' asthma.

7076. You have furnished some statistics of the deaths among male potters over 20 years of age at Stoke-on-Trent in certain years. In the 7 years, 1893 to 1899, what proportion died of lung disease?—50 per cent.

7077. And in the years 1902 to 1906, 5 years, what proportion died of lung disease?—In the first period, 1893 to 1899, the term "potters" includes all the branches of the trade; in the next period, 1902 to 1906, I have taken potters' pressers, that is, the branch of the trade which seems to be most affected. I might say that previous to 1886 in the death returns, the term potter was used to cover the whole of the occupations; just the simple term potter was used. Subsequently to that, and more so after 1898, terms such as potters' presser, potters' placer, potters' turner, and so on, were substituted.

7078. Of what returns are you speaking?—The registration returns. I found that amongst potters' pressers lung diseases were very common; 77 per cent. of them seemed to die from lung diseases.

7079. Was that from 1893 to 1899?—Yes.

7080. And in that class during the later period what was the proportion?—Exactly the same. In the first case the figures were worked out to 1899. I have not turned up the figures since, and the later period I worked out on Saturday, and it turned out to be exactly the same proportion.

7081. Are the potters' pressers a large class?—That I am unable to say.

7082. Would you have many deaths in that class in a given year from respiratory diseases?—In Stoke we have the North Stafford Infirmary, and we have the workhouse, and from the year 1902 to 1906 there were about 71 deaths among potters' pressers.

7083. From respiratory diseases?—Yes, but the infirmary includes a very large district, and the workhouse includes the districts of Hanley, Stoke, Fenton and Longton, with a population of about 150,000.

7084. So that you have 14 deaths per year from respiratory diseases among this class?—Yes. Of course for the single borough of Stoke-on-Trent there would be fewer, because a good many of these deaths occur at the workhouse.

7085. I believe the figures of the North Staffordshire Infirmary show a large decline in the number of deaths from potters' asthma in recent years. Do you think that has been because there has been a real decrease in the disease, or do you think the diseases which used to be termed potters' asthma are now entered under other

heads?—I am quite sure recently that the deaths are not certified as potters' asthma; they are all certified as bronchitis, pneumonia, or phthisis. You do not get the term potters' asthma at all, or anything from which you could differentiate between ordinary bronchitis or phthisis in a potter and in an ordinary person. I went into the figures from 1892 to 1899, and compared them with those of the late Dr. Arlidge, and I found out of the total deaths during the 7 years, 1893 to 1899, occurring amongst males alone above 20 years of age engaged in the potting trade at Stoke-on-Trent 50 per cent. was due to lung diseases, phthisis 25, bronchitis 21, pneumonia 4. The late Dr. Arlidge put the proportion at 60, which was higher. Dr. Arlidge stated the deaths of male potters from diseases of the respiratory organs, in relation to their entire mortality from all causes was 60 per cent., as calculated for the entire male population. I came to the conclusion that the disease was less common and that there was a decided decrease from lung diseases among potters.

7086. Do you think that potters suffer from lung diseases owing to their employment?—I think they do.

7087. Is it your opinion that you cannot tell in any particular case whether the disease is due to the employment, or due to other causes?—That is so; it differs very slightly, and it is only by inquiry as to the occupation that one comes to a conclusion definitely.

7088. The disease may go on, I suppose, for many years before the worker is incapacitated from his employment?—Yes.

7089. Even as many as 15 or 20 years?—That is so.

7090. For how long a period would the disease be developing if the worker was, one might say, specially susceptible to lung disease, and if the process was a very dangerous one. What is the minimum period in which you would ever find a worker employed in pottery works showing symptoms of the disease?—I cannot say.

7091. Would you think it possible, if a worker had been employed only 6 months, he might show symptoms?—From those cases I have inquired into, I think not.

7092. Would you say a year?—I should think longer than that; I should say some years. For instance, I took three potters. — was the patient and he was 56 years of age. He had gradually developed the disease during the last 10 or 15 years. — was 47 years of age; he had attacks of bronchitis and shortness of breath, but he was well developed, and able to follow his employment. Then the other man was 32 years of age, and he had no signs. I think it takes years before the first signs of bronchitis show themselves.

7093. (Mr. Cunynghame.) I understand that out of the potters' pressers who die, 77 per cent., that is, roughly speaking, three-quarters of them, die of lung disease?—Yes.

7094. What proportion of the trade do the potters' pressers embrace?—I have not the slightest idea.

7095. Do you know the proportion of potters' pressers to the other employees in the trade?—I cannot say.

7096. What district are you dealing with?—Stoke-upon-Trent.

7097. How many potters' pressers are employed at Stoke-upon-Trent?—I cannot say, and that would not give you any idea, because those figures include the deaths in the infirmary.

7098. Why would it not give any idea?—Because it covers a large district, and many of them die at home.

7099. Supposing it is assumed that the 77 per cent. was representative, which perhaps it is not?—Exactly.

7100. Then may I say nothing can be concluded from your figures?—Those are the returns I have.

7101. I am not impugning them. But if you differ from me it does not seem to me, as at present advised,

that any conclusion whatever one way or the other can be drawn from this figure at all?—I should not like a definite conclusion to be drawn from it, unless it is confirmed in some way.

7102. May I take it for our purposes these figures throw no light whatever on the subject?—I cannot say they would throw any definite light at all.

7103. Can you indicate any light whatever which they throw upon it, because if so, I will follow it up?—It seems to me they are high, and I am inclined to mistrust the figures.

7104. I wanted to compare your figures with other figures, but I do not think I can, because it only means that 77 per cent. of the potters who have died there have died of lung disease?—And in my district as well. You see I get the whole returns.

7105. Does this figure include the whole number that died?—Yes.

7106. Then if we get the total number employed, we could get the percentage of those dying, could not we, taking Stoke-upon-Trent alone?—Many of those people come from other districts.

7107. Then it is impossible to use these figures for any purpose, is it not?—Yes, I think it is, unless they are checked.

7108. Then from your figures which you have given, correct though they are, a not much useful conclusion can be drawn, and they would require to be supplemented by other sets of figures?—Yes, I think so.

7109. You know a good deal about the pottery trade, I suppose, without being a practical potter; you know the health aspect of it, for instance?—Yes.

7110. Supposing dust phthisis were to be classified in the Workmen's Compensation Act for compensation, and you had to suspend people who were suffering from the disease, would there be a considerable number of suspensions? How would it work, in your opinion?—What I feel is that there would be the difficulty in deciding. A presser might get an attack of bronchitis early in his career, and put it down to potters' asthma; you might have a great many suspensions.

7111. Can you give any idea of what number there would be?—No, not the least idea.

7112. (*Professor Allbutt.*) In your précis you say, "Apart from what is for all practical purposes bronchitis in potters, I do not know of any disease which could be called potters' asthma." It is for practical purposes we are sitting, you understand?—Yes.

7113. However, to leave the practical purposes for the moment, and going more into the theoretical principle, the Committee have been given to understand that there is, pathologically, a very considerable distinction between the two?—I think there is.

7114. The difficulty is one, you say, of coming to a practical conclusion in the interpretation of particular cases?—Yes, quite so.

7115. The problem is therefore one of bringing scientific principles into practical use, is it not? You would say, as a scientific man, there is such a disease, the difficulty is to diagnose it; and we have to discover how far we can bring the more refined scientific diagnosis into use for practical decisions?—Yes.

7116. Is Stoke a district in which bronchitis is exceptionally prevalent?—I do not think it is exceptionally prevalent. I went into the point some years ago, and it is less prevalent in the Stoke district than in the surrounding districts of Longton and Fenton.

7117. And it is particularly the Pottery centre. I suppose?—Yes, it is practically the centre of that district.

7118. You examine a patient thoroughly, and upon this examination alone there might be very great difficulty in ascertaining how the disease arose?—That is so.

7119. Speaking as a physician, it appears from what we have heard, that the initiatory stages of common bronchitis and dust lung pursue, when fairly characteristic, a different course?—From my practical experience I cannot say that they do.

7120. Do you think that in general practice one comes across cases of bronchitis beginning almost

without physical signs—just with a short morning cough, no incapacitation from labour except shortness of breath, and without physical signs? Generally speaking, does not ordinary bronchitis begin more or less acutely? A man catches a bad cold, he has an acute bronchial attack, and is thus affected, say, for that winter, when he may get rid of his cough. But as I understand, here it is the converse; the illness does not begin with an acute attack of bronchitis, but as a slow cumulative effect on the finer tubes?—That may be so, but it would be, in my opinion, impossible to distinguish it from an ordinary cold. Usually it is for intercurrent attacks of bronchitis for which you are consulted.

7121. Which may last a few weeks?—But often you do not see these men more than a few days.

7122. But I am presuming that we are in possession of the whole of the information which is necessary?—You would have to get a very accurate account of how the disease commenced and its course, and that would be very difficult for practical purposes.

7123. Certainly; and then a person familiar with these cases would be able to judge, would he not? The picture of the course of dust lung as a whole from beginning to end, is a different story to that of ordinary bronchitis?—You would have to trust altogether to the patient, I think; you could not check it.

7124. Of course, every witness has to be trusted up to a certain point, as long as he is consistent with our previous knowledge?—No; so long as it is true. His story may be consistent with what we know, but it may be untrue, and you have to check it, and be quite sure that it is true. He may have quite a consistent story, but how are you going to check it? I have had a lot of these men through my hands, and I never thought of it as potters' asthma unless they developed it later on.

7125. But the Committee have been told by medical men, who have seen a good many cases of dust lung, that they do not anticipate any very great difficulty in deciding for themselves by their own observation?—My experience is that, comparing it with other things, if a man says "I am incapacitated," it does not matter much what the medical man says.

7126. Then you rather differ from our previous evidence, do you?—I do; it is the man's story, not the medical man's opinion which is taken.

7127. (*Mr. Cunynghame.*) But is not the medical man the man who decides whether a workman is to get the relief or not?—That is another point altogether.

7128. (*Professor Allbutt.*) I thought you were taking it as understood that these cases would be decided by an expert medical referee?—I do not know anything about that point.

7129. However difficult it may be on a given day and with the knowledge of the day to interpret a patient's condition, yet if we are put in possession of a fair knowledge of the course of his disease from beginning to end, this course might be regarded as fairly characteristic, might it not?—Would you put it, the course of disease and occupation?

7130. Yes, the whole story?—Yes.

7131. It is common knowledge, is it not, that by examination after death the two conditions are discernable, and one can make a diagnosis from inspection of the parts?—Yes.

7132. If the sputum is examined in these cases, the fine silicious particles are easy to find, are they not?—That I do not know.

7133. In these cases, in the later stages, tubercle is apt to supervene, does it not?—In the cases in which I have had the sputum examined, which are not many, there have been no tubercle bacilli. I find, in looking through the death statistics, that those who died of phthisis died much earlier; 44 was the average age I got for those.

7134. Using the large body of post-mortem evidence which we have had, and an extended clinical experience on such lines as I have indicated, on the whole process from beginning to end, do you think that decisions in individual cases would be more than ordinarily difficult?—When it is well developed, and a man is incapacitated, then I do not think there would be much difficulty, but up to that stage I think there would be.

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Mr. WILLIAM JAMES CHRYSAL, called and examined.

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7135. (*Chairman.*) Are you the managing partner of Messrs. White's Chemical Works, in the neighbourhood of Glasgow?—I am.

7136. Are they manufacturers of bi-chromate?—Bi-chromate of potash and bi-chromate of soda.

7137. Do you consider that the workmen employed in that industry suffer from any disease owing to that employment?—No, I do not consider it a disease.

7138. Do they suffer from ulcers or from injury to the septum of the nose?—I understand that in some instances they have ulcers in the hands, but they are more or less trivial.

7139. Have you ever had any man employed in your works who has been prevented from working by injury to the nose?—Not that I am aware of.

7140. Have you ever had any man who was prevented from working by ulcers?—In an isolated aggravated case I have, where gross carelessness was shown with regard to keeping the hands clean and having them attended to.

7141. When you say an isolated case, do you mean an isolated case here and there?—Yes, occasionally; once in six months or once a year.

7142. It has been stated that 90 per cent. of the men employed suffer from perforation of the septum. Do you agree with that?—Not at all. I think it is a misleading statement, and I think Dr. Buchanan, who gave that evidence, fell into a misunderstanding. Whether he referred to the 35 men he examined or not I do not know, but that is the only solution I can see.

7143. What are those 35 men employed in?—He was asked at question 5613: "How many men are there employed and that you examined," and he said, "There would be an average of about 35 men weekly, about 140 a month." That, to begin with, is a little misleading. Does the number of men employed mean the total number of men in the factory?

7144. Can you tell us how many men are employed in the factory?—There are 700 men employed in the factory.

7145. How many of those are engaged in processes in which they are exposed to risk?—The figures I have here bring out the total of 197 men, or, roughly, 200 perhaps. These men are the men that have to go before the doctor. I hold that there are 50 per cent. of these men, that is, 38 at the furnaces in one work and 44 at the furnaces in another work who are not under the influence of chromates in any way whatever, but still we have to obey the special rules drawn up, perhaps hurriedly, and that makes the total higher.

7146. Do you think, when Dr. Buchanan said 90 per cent. suffered from perforation of the septum, he meant 90 per cent. of a much smaller total than the whole body of men employed in the works?—I think he meant 90 per cent. of the 35 men mentioned in that question.

7147. In what way are the 35 men employed?—Those were the men he examines monthly chiefly from the Crystal house.

7148. But you are sure that no man is incapacitated from work by this injury to the nose, are you?—No, not that I am aware of.

7149. How do you think the ulcers arise on the men's hands?—The ulcers arise on the men's hands by their having the skin injured or a cut, and the chrome liquor getting into the cut or wound. It never does any injury unless there is an abrasion of the skin.

7150. Do you consider that these ulcers can be easily diagnosed as being due to chrome?—No, I do not think so, because the doctors seem to think that the men at the chrome furnaces have chrome sores as well as men in the crystal house, but as they do not come into contact with chrome at all I do not see how it can possibly be. I think these chrome ulcers are very much the same as if any foreign material got into a sore on the hand and caused suppuration.

7151. Is there much dust arising from the bichromate of potash?—No; I consider the amount of dust is infinitesimal. I do not allow the crystal to be dried

sufficiently to cause dust. I prefer rather to try to prevent dust than to remove it after it is formed.

7152. Are you acquainted with the conditions in works in which bichromate of potash is manufactured other than your own?—I am not aware that I have ever been in another chrome works during operations. I have frequently been in them while they have been standing idle, perhaps for sale, and I have bought them at different times, and I have seen the different appliances in them.

7153. Do you know whether there is much dust evolved in other works than your own?—I believe in Germany they were very bad at one time.

7154. But in Great Britain, I mean?—Not in Great Britain that I am aware of.

7155. (*Dr. Legge.*) So that if injury caused by bi-chromate of potash or soda were included in the schedule, it would not be a very serious matter, so far as your firm is concerned?—It might cause us a deal of serious inconvenience.

7156. In what way?—Chiefly by unreasonable claims. You see the men at present get compensation by getting higher wages; the moment they enter the crystal house they get an increase of wages.

7157. (*Chairman.*) Why do they get an increase of wages?—To compensate them, in a sense, for any little inconvenience which may be caused by ulcers on the hands.

7158. (*Dr. Legge.*) There is the experience of all the years now during which there has been periodical examination of these workers, and the knowledge gained that as a rule incapacity is not caused, and that would be taken into account in determining the incapacity alleged, so that I do not see how this difficulty you speak of would arise. Any claim would be certified by the examining surgeon, and settled by a medical referee, who would determine the amount of injury and incapacity it caused, would it not?—We are not aware of any incapacity, and it seems a trivial thing to schedule a work in consequence of ulcers on the hands.

7159. Do ulcers occur on the foot in a similar way?—That could only arise under similar circumstances. If there was an open sore, and liquor got into a man's boot, and it was not treated, the same thing would occur; it would occur in the case of any abrasion of the skin.

7160. Bichromate of potash and bichromate of soda are caustic, and are far more irritating than any ordinary dirt which may get into a wound, are they not?—Of course, it is a destructive oxidising agent, and destroys tissue rapidly, but at the same time, when you feel it getting in you can wash it out even with your mouth, or go to the pipe, and if you prevent any more getting in you have no ulcers, and need have none, so that it is really no more serious than ordinary foreign matter getting into a wound.

7161. Do you know how many men the appointed surgeon to your works has to transfer to other work?—No; I have no statistics. I believe the number is very small. I would like to hazard it that out of 200 he examines he only removes 2 or 3 per cent. per annum. You might call them isolated cases again.

7162. Do you regard the sore places caused on the skin as more serious than the perforation of the septum, and more likely to lead to the necessity for abstention from work?—I would say it causes more temporary inconvenience to the worker.

7163. Do you take exception to the statement that out of 100 men employed in the crystal house there would be perforation of the septum in 90 per cent.?—Yes, I think that is too high. Of course, it reads at present 90 per cent. of the total workers in the works have it. I would not like to say Dr. Buchanan is wrong, if he said that out of 130 men examined by him 90 per cent. might have the septum injured, but I think he means the 35 men he examines monthly.

7164. Do you know of cases where dust from the material in packing gets into the eye and causes inflammation of the eye, which might very well lead to abstention from work for a week?—No, I have never seen it; I have seen the eyes slightly inflamed

if a man gets a splash or drop of liquor into them. It is well known, and it has to be washed out at once. A man generally fills his mouth with water and blows it into the man's eye, and I have never known permanent injury resulting from it.

7165. Still you recognise, do you not, that the material causes injury arising in the course of occupation—I do not say serious injury—but it does cause injury?—I would hardly call it injury.

7166. But it would be injury?—Trivial, I consider it, if care is taken and the men were amenable to cleanliness, and to the special rules.

7167. All the experience of the workmen of those special rules is to show that the amount is small, but it does exist, and we must take account of it?—Quite so.

7168. Have you experience of injury in the dyeing trade from the use of chrome?—No, I have no knowledge. There are, of course, large Turkey red works near where I reside, and I have been in them occasionally, but I have no knowledge on the subject.

Mr. L. A. DUNN, M.S., F.R.C.S., called and examined.

7175. (*Chairman.*) Are you on the staff at Guy's Hospital?—Yes.

7176. Have you been for several years surgeon to the National Truss Society?—Yes.

7177. You are kind enough to attend to give evidence on hernia and housemaid's knee. With regard to hernia, are you of opinion that any cases arise in which hernia is contracted gradually, and not suddenly?—Yes, quite.

7178. We will limit ourselves to the gradual cases, because if it is contracted suddenly it would be an accident, and not a disease. But, as a matter of fact, do any cases arise in which hernia is not contracted gradually, but at a given moment?—If it is a congenital hernia, that is to say, if there is a weakness down in the scrotum, it may come down suddenly, although it has not been there in early life; but other than that it is always gradual, except from accident.

7179. What kind of accident do you mean?—An injury direct to the abdominal wall.

7180. Not a muscular strain in lifting heavy articles or anything of that kind?—It would be gradual except in one of the so-called congenital forms, and then it would come down suddenly; otherwise it starts as a small bulging, and gradually gets bigger and bigger, till it comes right down.

7181. Do you think that persons who are engaged in laborious occupations involving muscular strain are more liable to hernia than other people?—Straining always renders them more liable. Given two persons equally weak or equally strong as regards the abdominal wall, the person who strains is more likely to get a hernia than the one who does not.

7182. Do you think in any given case it would be possible to say whether the *causa causans* of the hernia was the strain at the moment when the hernia came down, or was not?—No.

7183. Supposing a man was a railway porter and suddenly found himself suffering from hernia, do you think it would be in any case just to say that that was due to his occupation, or might he just as likely have developed the hernia by coughing or sneezing?—Quite; of course the strain is the same really; when you cough there is the strain on the abdominal muscles, and when you are pushing you fix the abdominal muscles in exactly the same way, and hernia would be likely in either case.

7184. Putting it generally, do you think that hernia can ever be regarded as an industrial disease?—I should say not; certainly not.

7185. (*Professor Allbutt.*) In an individual affected with hernia there has always been, has there not, some contributory condition, some original defect in his bodily conformation, which has contributed to the event?—Usually.

7186. Assuming a man as absolutely sound to begin with, could any amount of muscular exercise produce hernia?—I think so.

7187. Would it be sudden or gradual?—There would

7169. I was thinking of the slub dyeing in the district round Bradford?—I have no knowledge in that direction.

7170. Would you be surprised to hear that considerably more complaint is made by the workers there of injury arising from chrome ulceration than is made in Glasgow?—In one sense I ought to be very much surprised, but I am not, because in a dye works the vats contain a great many more things than chrome—half a dozen other chemicals—and it is very hard to blame chrome for everything in the vats.

7171. (*Mr. Cunningham.*) You are not familiar, are you, with the use of spirit of salt?—Yes, muriatic acid or hydrochloric acid.

7172. Do you use it in your works?—We manufacture it as a bye-product.

7173. You do not use it?—No; it might be used in an infinitesimal degree in the plumbers' shop.

7174. I suppose your argument about chrome is that an injury from it is not very different from an injury arising from spirit of salt in soldering?—I have no knowledge of any injury caused by spirit of salt.

be a bulging. I should think if he was absolutely sound, as strong as any man could be, there would be only one place where it could come down, and that would be through the inguinal canal, where the cord of the testicle comes. If that was done with sufficient force to burst through the peritoneum, it would become sudden.

7188. But in the large majority of cases there is some original weakness at the wall, I suppose?—Yes.

7189. So that Nature has contributed as much to the hernia as the strain?—Yes.

7190. (*Dr. Legge.*) Taking the case where it was possible for an exceedingly violent exertion to cause a sudden protrusion of the bowel through the canal, what signs would you get to enable you to be certain that it was due to accident, and that it was not gradual?—It would come down in the canal in any case, and you could not be actually certain until you were operating and found the peritoneum was ruptured, otherwise you could not possibly tell externally.

7191. Would there be severe pain?—Yes, but of course you could not tell if the man had pain—you would be trusting to what the man said.

7192. Would the pain be so severe as to necessitate medical aid?—I should not like to say whether it would or would not; probably it would.

7193. Would it be reducible; could he reduce it himself?—I should think not; a surgeon would probably, unless it had got tightly nipped, then it would be strangulated.

7194. Would it be likely to be tightly nipped?—Quite likely, I should think, if it suddenly dilated out into the canal.

7195. Is it more or less likely than in the case of umbilical hernia?—Less likely.

7196. So that one could practically exclude the possibility of an inguinal hernia arising as an accident?—Certainly.

7197. (*Chairman.*) Are there any statistics of the incidence of hernia amongst porters, dock labourers, and so forth, compared with the rest of the population?—I do not know of any.

7198. From your experience should you say it is probable the incidence is much larger amongst those classes of people than amongst the ordinary population?—It is difficult to answer that question. One sees a large number of that class of people, no doubt, but I could not say for certain.

7199. You would not say, in any given case, "This man is a dock labourer, so of course he is very liable to have hernia"?—No, I should not.

7200. Any more than you would say it of a policeman?—No.

7201. (*Professor Allbutt.*) Is a sound man quite strong in his abdominal walls?—No, far from it; there is always a certain amount of weakness there,

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Mr. L. A. Dunn,
M.S., F.R.C.S. 7202. So far, then, muscular exercise ought to be
 19 Feb. 1907. against hernia?—Yes.

7203. (*Chairman.*) Turning to the housemaid's knee, that, of course, is a distinctly trade disease, so to speak. Do you find it amongst other people besides domestic servants?—There is no doubt that people who do kneeling, especially kneeling on hard stools and floors, suffer from it. Carpet-layers, I believe, do suffer from it.

7204. Any other classes?—One does not see many. Those are the two classes who do the kneeling, and they do suffer from the disease.

7205. Do you think it is easy to diagnose housemaid's knee?—Quite.

7206. It is not liable to confusion with other ailments, is it?—No, it is simply a bag containing fluid in front of the kneecap; that is usually what is called housemaid's knee. Of course it may form matter, and become a serious thing, but what usually is called a housemaid's knee is that fluid collection in the bag in front of the kneecap.

7207. As to this ailment of the knee from which domestic servants suffer, what more scientific name has it?—Chronic patella bursitis.

7208. Would that term cover all affections of that kind due to kneeling?—Yes.

7209. How long, as a rule, would a person suffering from housemaid's knee be incapacitated; what is the maximum period?—It would entirely depend on how they are treated. This fluid collects in a bag or bursa, and it may be absorbed with rest and treatment and return again very shortly. If the whole bag is taken right away it does not return and is quite cured. In that way it might be cured in, say, a month. In the other way it might take 3 or 6 weeks, and even then be liable to return.

7210. The worker being in the meantime incapacitated from employment?—Yes.

7211. (*Mr. Cunynghame.*) This disease, I suppose, exists among all the population—not only servants, but people who are used to kneeling?—Yes, it is the fact of kneeling which causes it.

7212. Would you describe it as a trade disease, or as a sort of thing that may be got by anybody?—It may be got by anybody who kneels.

7213. (*Professor Allbutt.*) Is it preventible by the use of certain mats?—Certainly.

7214. In what degree do you think; do you think they are a complete prevention?—I think it prevents it to a very great extent, and I always think that those housemaids who kneel on cushions very seldom get it, whereas other people, who kneel on the bare floor, frequently get it.

7215. Supposing in that initial stage of which you spoke, when the bursa is filling with harmless fluid, the person betook himself to a properly constructed mat, would it prevent further progress of the malady, do you think?—Probably it would.

7216. Do you know what is called miner's beat knee?—No.

7217. The Committee are disposed from the evidence to draw a distinction between the miner's beat knee and the housemaid's knee? Would that be in accordance with your impression?—I should think so.

7218. But of the disease itself in London you have no experience?—No.

7219. (*Dr. Legge.*) Does housemaid's knee often go on to suppuration?—No, not often.

7220. That would prolong the illness, I suppose, for some months?—Yes, it is a formidable thing when they suppurate.

7221. (*Professor Allbutt.*) Do you operate at once then?—Yes, we let out the matter at once. Then of course we cannot remove the bursa. That obliterates it, and it takes a much longer time for the patient to recover.

7222. (*Dr. Legge.*) In Guy's Hospital, I suppose, there would be cases of suppurating housemaid's knee in the course of the year?—There might be, but when you say housemaid's knee there may be suppuration of the bursa, which may have been produced by wounds and injuries, and so forth, not necessarily following on kneeling.

7223. Is the suppuration often consequent upon the tapping to let out the fluid?—Yes, certainly, if it is done by unskilled people, using septic instruments, and so on.

7224. It is a common treatment in cases of the kind for them to be tapped?—We never teach it. I should strongly object to the tapping.

7225. On the ground of the danger of suppuration do you teach that they should not be opened?—Yes, quite so.

7226. Does that suppuration involve sometimes necrosis of the patella?—Yes, it may.

7227. (*Chairman.*) I gather from what you say that cases might arise in which there may be injury to the knee caused by wound and not by kneeling?—Yes.

7228. Would not that be likely to lead to confusion in some cases. Suppose housemaid's knee were scheduled under the Workmen's Compensation Act, might not cases arise of claims for compensation from persons who said they were suffering from housemaid's knee, but who really had a poisoned wound in the knee?—Yes.

7229. And you could not differentiate the two, could you?—No, you could not, except from the history.

7230. You could not say from the symptoms merely, "This is a case of housemaid's knee," could you?—No.

7231. (*Professor Allbutt.*) It would be more like a beat knee, I suppose?—Yes.

7232. (*Dr. Legge.*) That would be a very rare condition, would it not?—Yes.

7233. (*Chairman.*) Compared with ordinary cases of housemaid's knee it would be very rare, would it?—It would be very rare.

TWENTY-FOURTH DAY.

Monday, 25th February 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).
Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.
Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

PROFESSOR JAMES A. LINDSAY, M.A., M.D., called in and examined.

7234. (*Chairman*.) Are you Professor of Medicine of Queen's College, Belfast?—Yes.

7235. Have you been for 23 years in practice in Belfast?—Yes.

7236. Have you had a long experience on the hospital staff as physician?—Yes, 18 years.

7237. Have you had under your care from time to time a considerable number of persons working in the flax mills?—I have.

7238. Do you consider that this trade gives rise to any specific trade diseases?—Yes, not diseases peculiar to the trade; but diseases to which the trade will conduce to a certain extent.

7239. What diseases have you in mind?—Bronchitis first, with its consequences, namely, emphysema for example, and disease of the bronchial tubes generally.

7240. Any other?—Phthisis, I should say.

7241. They are diseases of the respiratory organs, are they?—They are.

7242. Do you consider that these diseases can be differentiated as being due to employment in comparison with similar diseases prevalent among the rest of the population?—That is a matter of considerable difficulty, but one can throw some light upon it, I should say. If you look at these Tables I have here you will find on the last page, first of all the total number of cases treated in the Royal Victoria Hospital of certain diseases, and then the proportion of flax workers, and I think you might take it the flax workers constitute about one-tenth of the cases approximately. The first column includes all occupations, and the next column the flax trade, and if you take it the flax workers are about one-tenth of our patients you get some idea of the relative proportion. These are in-patients.

7243. (*Professor Allbutt*.) How many beds have you in the hospital?—300; about 250 in regular occupation.

7244. (*Chairman*.) Is 10 per cent. an exact figure?—No, it is not; it is as near as I can get it.

7245. Do these tables show that on the average for the two years, 1904 and 1905, for bronchitis, flax workers are about one-fourth of the cases?—Yes. That gives you a certain index of the larger proportion of disease amongst them.

7246. I also find that of gastric ulcer the flax workers number about one-third of the cases?—Yes. We get a very large proportion of gastric ulcer in Belfast, and treat well on to 100 cases in a year. They are mainly amongst the spinners—that is, amongst flax workers, who are young women.

7247. Is there any connection between this disease and the employment?—That is a point that might be debated. The connection is not very close or very obvious, but the spinners suffer very much from anæmia, and how far it is conducted to by the condition of the workrooms is a question that might be argued. They get anæmia first of all and then gastric ulcer. I should not be prepared to say there is no connection between the two.

7248. (*Professor Allbutt*.) Would you draw any distinction from the sexual conditions?—I should think so.

7249. Are the majority of spinners women, or men?—They are all women, women of an age in whom gastric ulcer would be likely to occur.

7250. (*Chairman*.) With regard to bronchitis patients, of those entered under all occupations, would a large proportion belong to the working classes?—Yes, practically all with an occasional exception. Then heart disease is a rather high proportion.

7251. Yes, between a sixth and a seventh?—Yes, that is probably due to rheumatism to a large extent. It is possible the warm damp air of the rooms has some tendency to conduce to rheumatism, but it is often the fault of the workers themselves, who decline to adopt the precautions recommended to them. The tables include an analysis of the number of flax workers treated for three years, with their diseases, and give the average age at which they came under treatment.

7252. (*Professor Allbutt*.) At what age do the spinners begin to go into these close, hot rooms?—12 to 14 years of age.

7253. But rheumatic fever incidence would be a little earlier than that, would it not?—It would, but not in all cases.

7254. Is rheumatic fever particularly common in your district?—We do not get a great deal of the very acute type.

7255. But severe enough to affect the heart, is it not?—Yes, and there is a very large proportion of heart disease in those tables.

7256. (*Chairman*.) Do you notice in the cases of bronchitis any symptoms peculiar to a person who has been working in a dusty atmosphere?—I do not think you could draw the line perhaps with certainty, but what we call irritative bronchitis—that is, bronchitis arising from some irritant in the air—does pursue a course which we can describe, though it is not a separate disease.

7257. Would an expert medical man, who had made it his business to study the differences between the different forms of bronchitis, in any given case if he knew the history, be able to say whether it was due to employment or was not?—He would not unless he held a post-mortem and saw the lungs after death.

7258. Do you think there are any symptoms distinctive of mechanical bronchitis which could be stated definitely as being due to dust?—I would say "No" to that question, although there are certain symptoms which are more characteristic of that mechanical form than bronchitis in general—for instance, spasmodic cough is very marked, and the asthmatic form of bronchitis is not uncommon. The coughing is rather violent and occasionally it results in hæmorrhage.

7259. Have you ever had any experience of potters' phthisis?—No.

7260. Or any other form of phthisis arising from dusty occupations?—No; no experience of any extent. Our experience, medically speaking, is that the finer the particles the worse the case. For instance, the flax trade is not so deadly as the steel trade of Sheffield.

7261. Would you express an opinion as to whether it would be easier or more difficult to find distinctive symptoms of trade disease, so to speak, in bronchitis

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amongst flax workers as compared with bronchitis amongst potters or steel grinders?—My experience is confined to one side of that problem, and perhaps I ought not to answer that question; I should have a difficulty in answering it.

7262. Are there any particular processes in the flax industry in which the workers are more liable to lung troubles than others?—Decidedly. Without going into the details of the trade I think one might classify the workers from the health point of view into three classes; one might take departments where dust is a feature for instance—roughing, hackling, and carding. Those are the coarser processes in preparing the fibre, but there has been a great improvement with the modern system of exhaust ventilation. That is one class. Then come the hot and damp departments where the air is both hot and damp; for instance, the spinning rooms and the sizing rooms. The temperature of the average spinning rooms will range from 73 to 79 degrees, and the temperature of the sizing room will range from 80 to 120 degrees. It is never allowed to get to saturation point, because that is illegal. The spinning room is damp because it is wet spinning in the North of Ireland. There is a good deal of moisture in the air, the floors are necessarily damp, the workers' clothes and feet get damp unless precautions are taken. They wear mackintoshes and protect their feet, and have splashboards, which diminish a good deal of the amount of moisture coming from the water. Then there is a third class of room, a room which is hot and not damp, and the question there rather is as to the purity of the air and the amount of carbonic acid which is found to exceed nine per 10,000 volumes pretty often. The average air contains about four per 10,000 volumes, and if you double the ordinary atmospheric average you get injurious impurity.

7263. (Professor Allbutt.) Is that heat necessary for the process; it is an accident I suppose, and not essential?—No, except, of course, that light is an essential; it is not part of the trade. If you distinguish the departments I divide them roughly into three classes—the dusty departments, the hot and damp departments (spinning and sizing), and the departments that are rather hot and not damp; for example, some of the weaving rooms. The difficulty in the first case, of course, is the question of dust; in the hot and damp rooms it is largely a question of girls working when in a hot atmosphere and then going suddenly into the air outside, and in the hot departments which are not damp it is a question as to the purity of the air.

7264. (Chairman.) Is there any specific trade disease arising from the hot or damp rooms as compared with other trades to which persons are exposed to heat and damp?—No, but the spinners suffer much from ordinary phthisis; how far it is due to their occupation, their habits, or housing, is a question which might be argued.

7265. Is it a fibroid phthisis from which they suffer?—I should say amongst those in the dusty departments it is to a certain extent, but not amongst the young women where it takes the ordinary form.

7266. Should you say fibrosis of the lung was definitely due to dust?—I should say dust is an important factor, but it is not the sole factor.

7267. Should we be entitled to say that a worker engaged in a dusty occupation suffering from fibrosis of the lung had contracted that disease through his employment?—In general terms yes, though some qualification would be necessary.

7268. What qualification?—The housing of the workers, which I think is a very important question.

7269. Would that give rise to fibrosis as distinct from tuberculosis?—It might make a patient liable to tubercular infection, and the trade might determine the form of the infection. A man might become tubercular and his trade might tend to produce the form of tuberculous fibroid.

7270. Is it possible to tell with certainty whether a person is suffering from fibrosis of the lung?—It is comparatively easy. I think you will agree that the first fact in a tubercular case is the specific invasion of the lungs, then the result varies very greatly; in one case it takes rather an acute form, the bacilli spread rapidly through the lungs, and the patient dies perhaps in a few months. That is a rare form; that is acute tubercular phthisis. Then there is the second or

ordinary case where what we call excavation takes place; that is the usual form. Then there is fibrosis, where the principal change of the lung is not excavation or breaking down, but a change of the tissue into a fibroid tissue. That last form runs a longer course, and is a more favourable form. From the fact that that is not uncommon amongst roughers and hacklers it is a question how far it is due to their trade. There is no doubt it is a factor, but they have good resisting powers; they are in the prime of life, and the tuberculosis more often takes the form of fibrosis in a patient who has good resisting power, notwithstanding what his trade is.

7271. What is the incidence of phthisis of all forms amongst roughers and hacklers?—I could not say; there are no recent figures. There is a report of Dr. Charles Purdon in 1875 which is alluded to in some of the Blue Books.

7272. That would be very much out of date, would it not?—It would. He gave the figure as 11·1 per thousand, but that is 30 years ago. The only recent figures I can get are in a Blue Book of 1897, but they are practically of no value because the flax trade is mixed up with the cotton industry.

7273. Have the conditions of work altered in recent years at all?—Notably.

7274. In what way?—The existing system of ventilation has constituted a revolution in the trade.

7275. (Professor Allbutt.) For how long has the existing system of ventilation been in use?—It might have begun 10 years ago, but I could not be quite certain.

7276. (Chairman.) Do you think liability to diseases due to dust has been thus greatly diminished?—I do. That would apply more to the dusty departments than to any of the others. The roughing room now with a thoroughly efficient exhaust system of ventilation is much freer from dust than in former times.

7277. (Mr. Cunynghame.) With regard to "Total treated" in your Table, what does that mean?—The total flax workers.

7278. So that it would show the proportion of pulmonary diseases to ordinary diseases, would it?—Yes, and it would include surgical cases—all cases.

7279. When we come to the last page of the tables: "Patients admitted to the Royal Victoria Hospital, average of two years, all occupations," does that mean other than flax employees?—Yes, that is an analysis of the total number of cases of certain disease amongst all occupations.

7280. Adding the whole together, bronchitis, pleurisy, cardiac disease—would cardiac disease be a disease of occupation?—No.

7281. I suppose pleurisy and pneumonia might be?—I think their relation to the trade is very slight.

7282. So that we might take bronchitis as a possible one, might we?—Yes.

7283. Pleurisy and pneumonia, no, and cardiac disease would be out of it?—The relation to rheumatism would have to be considered—how far, for instance, young girls going into the air from hot rooms would contract rheumatism or heart disease.

7284. According to that ladies coming out of a playhouse rather thinner dressed than they ought to be would be in the same position, would they not?—Yes.

7285. But you would leave out cardiac disease, I suppose?—I should not be prepared to say the trade would have any very great influence upon it.

7286. Then take kidney disease?—I think there is no special influence.

7287. And gastric ulcer?—There I think there is a point; it is very common amongst spinners who get anæmia.

7288. And it arises from the anæmia, does it?—There is a certain connection, but it arises very largely in consequence of their diet not being proper; they live upon tea and bread.

7289. Then I come to tubercular disease of glands and bones?—You will notice the omission of phthisis in that Table, because we do not admit phthisis cases into the Royal Victoria Hospital.

7290. May I say that tubercular disease of the glands and bones is caused by inhaling dust?—I put it down as throwing a little light on the question inasmuch as

we do not get tuberculosis of the lungs, but we do of the glands and bones.

7291. Does it come to this, that out of the total number of patients admitted, 610, 59 would have bronchitis?—Yes.

7292. And the flax workers' proportion would be 14 out of 111, would it?—Yes.

7293. So that the flax workers' proportion is rather greater, but not very much greater than the whole?—Yes.

7294. The difference between the bronchitis caught by the flax workers in proportion to the total number is not very much greater than the difference between the proportion of bronchitis caught by the ordinary person, is it?—No.

7295. Can you give the total of all occupations treated?—Our in-patients average about 3,000 a year.

7296. May I take it then that out of 3,000 59 would have bronchitis?—Yes.

7297. What is your total of flax workers?—I think 10 per cent., but I give that figure with some reserve.

7298. 300, do you mean?—Yes, but you will clearly understand that is not a certain figure.

7299. Then is it 59 out of 3,000 as compared with 14 out of 300?—Yes.

7300. (*Chairman.*) When you said 10 per cent. was a provisional figure, it certainly would not be 20 per cent., I suppose?—No, I think not.

7301. Might it be 15 per cent.?—Hardly; it might be 12 per cent.; I am only giving an opinion because the registration is not very perfect, and the workers do not always give their occupations correctly. I was struck myself with the figure when I worked it out, coming to 10 per cent., because my impression was it would be higher.

7302. (*Mr. Cunynghame.*) Should you say that owing to the position the Royal Victoria Hospital occupies in the town with regard to the factories, it is quite possible if we take the whole number of patients the figures might not be representative? It might be misleading to represent a particular hospital as indicative of the state of a town, I suppose?—The Royal Victoria Hospital is the leading general hospital, and was for a long time the only one. There is another one now which is an important hospital, but much smaller, and I should say our experience is very typical of the town, for amongst others reasons for this, that the workers pay a small sum weekly to the Royal Victoria Hospital; it is the custom to pay a penny a week, and they have the right to treatment, so that I think our experience is absolutely typical.

7303. But it is possible to say sometimes, is it not, that particular classes of workpeople get into the habit of going to one more than the other or going to hospital at all?—I see your point, but I think you may take it our experience is typical.

7304. At all events there is, is there not, a certain amount more bronchitis among the flax spinners than amongst the ordinary people; how much it seems a little difficult to say?—Yes; I should say the question as to how far you credit anæmia or gastric ulcer amongst spinners to the trade is a very arguable point that is not quite clear.

7305. It appears that there has been an improvement of late years in the ventilation of these rooms, a good deal owing to the regulations which have been enforced? Is that shown on these tables you have put in?—I do not think it is, but those tables all refer to the improved epoch.

7306. But they also include people, do they not, who, although they got ill in 1904 and 1906 had been getting ill for years?—True, but I think the improved ventilation goes back much further than three years. You would require tables of twenty years to have a basis of comparison. But our hospital has been only three and a half years open. The former hospital was a very different institution, and a comparison between the two would not be just.

7307. Do you know the habits of these young women. It has struck me that when you see the clothing hanging up in the ante-rooms and the clothes they come in they are totally inadequate?—Yes, the employers say that.

7308. They come in with damp clothes from the rain,

and when they leave they put them on, and instead of wearing really strong friezes, something like an agriculturist would wear, they wear the most miserable clothing, do they not?—A spinner is at work all day long in an atmosphere of 78 or 79 degrees and very damp, and will go out into an atmosphere, it may be of 30 or 32.

7309. And her clothing is very wretched, is it not?—She may have a shawl round her head and generally be insufficiently clothed.

7310. Is it your impression that they do not know how to clothe themselves?—I believe that they are careless, but there is more trouble taken now to instruct them than in former times, and employers show a great desire to put things right as far as they can.

7311. And with regard to food they do not nourish themselves properly, do they?—I should think carelessness with regard to food creates a good deal of the gastric ulcer.

7312. (*Professor Albutt.*) I notice that of the roughers and hacklers of whom the number is only 41, one in four have bronchitis and emphysema, according to your table?—Yes.

7313. Then going to another extreme, and taking the doffers, who are practically not engaged in dusty occupations, and the stitchers who are not engaged in dusty occupations, I find figures with regard to doffers with very slight dust are 1 in 19, and the stitchers numbering 90 come out at 1 in 40?—Yes.

7314. We must admit, of course, that these figures are not very large, yet it strikes me as a rather remarkable result that the figures as to those people who are not exposed to dust are 1 in 40, and as to the people who are exposed very slightly to dust they are 1 in 20, and then, coming to the roughers and hacklers, we find 1 in 4?—Yes.

7315. Are the Committee justified in placing some kind of reliance on those figures?—I think so, but I would not wish at all to press them.

7316. But may the figures be taken as broadly indicative of the state of things?—Yes.

7317. That would come to something like ten of the hacklers with bronchitis to one of those not exposed to dust at all, would it not?—Yes.

7318. Taking the spinners, what do you think is the prevalence of phthisis among them?—It is high.

7319. Higher even than bronchitis and emphysema?—Yes. You see very young women of 15 to 25 are rather liable to tubercular affection, and I should say their occupation affects them.

7320. In the spinning room I suppose there is no dust?—Hardly any. In the carding room, where there is a good deal of dust, they have jets of steam playing in order to carry the dust off.

7321. As far as dust is concerned, do not you think we might ignore all these cases, except roughers and hacklers, as likely to show any decisive injury from dust?—I suppose you might. One could not quite exclude them perhaps, but it would be a small factor. Roughers, hacklers, and carders, I think, might be included in the same category, but I should like to say with regard to them that the modern improvements are efficacious. In the better class of mill the conditions are fairly favourable now.

7322. Do the modern improvements for the removal of dust favourably affect the hacklers, roughers, and carders in the same measure as the other employees or more so? Do they reduce the dust to a moderate amount?—I would say slight. I was speaking for example to a man the other day who was apparently in the most vigorous health, a rougher. I asked him how long he had been roughing, and he told me 41 years. He was in good health, and came in my way quite by accident, and was not a patient.

7323. There is a large personal element of susceptibility in these maladies, is there not?—Yes.

7324. With regard to the duration of incapacity I find as a matter of fact that the time these patients stop in hospital ranges from three to five weeks. With regard to the age at which a patient comes under treatment I thought it might be of value to give the average age at which patients seek treatment.

7325. (*Chairman.*) What do you think is the general age?—Taking for instance bronchitis, the age is 45,

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for a rougher and hackler. They begin the business in early life, and if the average age is 45 when they seek treatment the probability is that a great many of them would seek it at a later age.

7326. (*Professor Allbutt.*) Bronchitis and emphysema falls upon spinners on an average 15 years earlier, does it not, than it does on the roughers and hacklers?—Yes. Spinners are young women, you see, and are not good subjects for resisting.

7327. Does the failure at the later age point to its being the accumulative effect of the trade?—In some respects, yes.

7328. Do hacklers, roughers, and carders become incapacitated in consequence of bronchitis or fibroid phthisis?—In some cases they become totally incapacitated, but we only get the temporary and curable cases. I think perhaps you had better take the opinion of Dr. Hall upon that point. In a bronchitic case, taking a patient who was totally incapacitated, his expectation of life would be about five years, and in a case of phthisis possibly about two. That would only be an impression.

7329. With regard to heart disease and rheumatic fever the only point of importance would be whether you found the age incidence in rheumatic fever, which is a disease rather of youth, to be high, say, still high after the age of 15; whether the mean age of the whole number of cases of rheumatic fever is higher because of a larger number of people attacked after 15 years of age?—I should be rather inclined to reply in the negative, but I have no information on the subject.

7330. Is the percentage of tuberculous phthisis high in Belfast?—Very high. I have some facts with regard to the returns as a whole.

7331. Can you give the percentage, omitting the flax industry?—No, our general death rate from phthisis is 3.1 per 1,000, and the English average is about 2 per 1,000. The trade is supposed to be one of the causes of the high rate, but the question is whether it is a large cause. Our total death rate is 20 per 1,000, and rather more than a third is due to respiratory diseases, which is a high proportion.

7332. Have you formed any opinion, either from the age or constitution of the patients, or otherwise, whether an outbreak of pulmonary tuberculosis is often determined by the presence of dust?—I think it is a factor, but I doubt if it is a dominant factor. I was more struck with it amongst spinners than roughers, but of course the age would have something to do with that.

7333. Amongst the spinners is there a large proportion of young women?—They are all youngish women.

7334. Gastric ulcer is a disease frequent in young women, is it not?—Yes.

7335. Therefore you could not rely much, could you, on its prevalence amongst them?—No, I think not.

7336. (*Chairman.*) With reference to the questions which Professor Clifford Allbutt put to you with regard to the figures you have handed in, do they show the number of cases of particular diseases in proportion to the number treated in the hospital, not in proportion to the number of persons employed?—Yes.

7337. Do they show that of the roughers and hacklers one in five of the cases treated were for bronchitis and emphysema?—Yes.

7338. But taking the spinners only 1 in 19?—Yes.

7339. That might prove, might it, that bronchitis was less prevalent amongst spinners than amongst roughers and hacklers, but it may prove that spinners suffer from a number of other complaints and come to the hospital for treatment. For instance, I see there were 44 cases of gastric ulcer, and 18 cases of anæmia, whilst amongst the roughers and hacklers there were only two cases of gastric ulcer and no case of anæmia. Therefore the fact that the spinners suffer from gastric ulcer and anæmia more than the men would show a lower proportion of bronchitis amongst them in proportion to the total number of cases treated, although as a matter of fact there may be as many cases of bronchitis amongst the total number employed?—That question tends to vitiate medical statistics a good deal. But I should hardly accept your conclusion.

7340. But it would be affected by that, would it not?—Yes.

7341. Could you supply the Committee subsequently with the total number of persons employed in each of these processes in Belfast?—I might be able to. I made enquiries what the total number of flax workers was, but I did not make enquiries about the different numbers in the different departments, but I think I could get you the approximate numbers. As far as I could make out there are about 35,000 to 40,000 flax workers including all processes.

7342. Similarly with regard to the figures of age, to compare the average ages of the patients in the different processes you ought really to compare them not with one another but with the average age of the persons employed in those processes. For instance, if the spinners are young women, and the roughers and hacklers are men of all ages, and you have bronchitis in all of them, you would expect to find the bronchitis at a lower age amongst the women than the men, would you not?—It is well known that the hacklers and roughers are people of all ages and the spinners young women, and you must allow for that obviously.

7343. Have you any figures which you can supply showing what is the average age of the persons employed in these different classes?—No, but I could obtain them for you. You would like, I understand, roughly, the proportion of the different classes.

7344. (*Mr. Cunynghame.*) Can you give the Committee the total number of the flax workers treated in your hospital for all diseases for two years?—If you will allow me to communicate with you a little later on I could give it. The 10 per cent. is, I believe, approximately correct.

7345. (*Professor Allbutt.*) Does not it really come to this—can you say as an expert whether such of the flax workers as are exposed to dust present a higher average of irritative bronchitis than the other part of the population?—Of that I have no doubt.

7346. (*Dr. Legge.*) The necessity for these figures would disappear, I suppose, if the flax workers were examined medically, would it not. You would get the facts in another way?—Yes.

7347. Do you know of an exhaustive enquiry involving the examination of 12,000 flax workers by medical men that has been made in Belgium?—No, I do not.

7348. Would you agree with the conclusion arrived at in the Belgian inquiry that as regards the men the most injurious processes in the order in which they are most injurious are hackling, carding, spinning, drying and preparing—that is amongst the men?—I do not understand men being engaged in spinning.

7349. Would that be the order in which it would appeal to you, hackling, carding, spinning, drying, and preparing? You have already said amongst the hacklers, roughers and carders you get the most dusty processes?—I would acquiesce in that order if you deal with irritative bronchitis alone, but if you are dealing with tuberculosis there might be some question.

7350. This is dealing with general diseases?—No. We regard spinners as the least healthy class.

7351. Coming to women, they regard carding as the most dangerous, then spinning, then preparing, and finally winding?—I should agree with that. Carding is undoubtedly the occupation amongst women which cause most irritative bronchitis, and spinners suffer from tubercular diseases.

7352. The most frequent illnesses among women were found to be first diseases of the alimentary system, then the nervous system, thirdly rheumatic, and fourthly respiratory; would you agree with that?—That would not be our experience at Belfast. I should put the respiratory diseases higher.

7353-6. And those of the longest duration are given first as those of the alimentary system, secondly the respiratory system, and lastly rheumatism. Would you agree with that?—Yes, I think I should perhaps agree with that.

7357. Do you know anything of a condition known as mill fever?—I have heard of it.

7358. Do you see cases of it?—No; Dr. Purdon has alluded to it in his report.

7359. Do you see eczema amongst the workers?—Yes.

7360. What form does it take?—It is not extensive.

7361. Does it lead to incapacity for work?—The only

form I see to any extent in practice is the eczematous ulcer; they do not get it in their hands much.

7362. Can you say definitely that that is due to their employment?—I think that varicose veins are partly the result of long standing, and they cause ulcers in the legs sometimes, but that might apply to any trade of course.

7363. I was not thinking of varicose veins but of

any definite eczema which occurred to the doffers, for instance?—No, one sees a case occasionally which is not of much importance.

7364. (*Professor Allbutt.*) Do you find flax particles in the sputum of many cases of chronic amongst hacklers?—Yes, I think so.

7365. And of course after death in the lungs?—Yes.

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Mr. ROBERT HALL, L.R.C.P., L.R.C.S., called and examined.

7366. (*Chairman.*) Are you in practice in Belfast as a medical man?—Yes.

7367. Are you medical officer of health?—No, I am medical officer to the infirmary.

7368. Have you a general practice as well?—I have a general practice as well.

7369. How long have you been in Belfast?—All my medical life—21 years.

7370. Have you had experience of a large number of cases among flax workers?—Yes.

7371. Have you had some thousands of cases through your hands?—Yes. For a large portion of the time my experience has been purely hospital experience, but between times I had a dispensary and came into close contact with patients in their own homes; that was 14 years ago.

7372. Do you consider diseases of the respiratory organs are more prevalent amongst flax workers than amongst other people?—My statistics would rather prove so. I have a table here giving certain figures.

7373. What is the conclusion to be drawn from it?—That a large proportion of flax workers are troubled with bronchitis and also with phthisis. That is shown in column.

7374. Column 1 gives the occupations—(males); weavers, roughers, hacklers, spinners, drawers, yarn dressers, yarn bundlers, machine boys; (females), weavers, rovers, spinners, doffers, drawers, reelers, preparers, winders, spreaders and carders.

7375. Have you any statistics showing in the first place the proportion of cases of these diseases to the total number of persons employed in these processes, and in the next place the proportionate number of cases of these diseases among the population generally?—I did not take any particular note of the number, but these cases, 151 plus 96, represent the total number of flax workers suffering from chest affections that came under my care during the year 1906, that is out of 352 workers. The total number of cases treated in my wards during the year was 3,800.

7376. Were they persons of all occupations?—Yes.

7377. Roughly speaking two-thirds of the cases amongst the flax workers you had to deal with were cases of disease of the respiratory system, were they?—Quite so.

7378. What would you say roughly would be the proportion among the rest of the population?—Hardly quite so high as that.

7379. Does the bronchitis from which flax workers suffer show any symptoms which would enable you to differentiate it from bronchitis amongst other people?—No, not in my experience.

7380. Supposing you had in your hospital two workers, one of whom was engaged in a non-dusty occupation, say a railway man, and the other was engaged as a rougher in a flax mill, both of them suffering from bronchitis, would you expect to find a different form of bronchitis in the rougher to that in the railway man?—It would all depend upon the stage. In the early stage there would not be any difference, but the bronchitis in the rougher would be much more likely to recur, and the more frequently it recurred the more persistent the attack would be, and by and by he would be suffering from chronic bronchitis, that is to say, he would have bronchitic sounds in the chest all the time, and ultimately he would develop an emphysematous condition. That condition is more prevalent amongst flax workers at a late stage than it is amongst ordinary workers.

7381. If you knew the history of a case from the beginning, would you be able at any stage to say that the illness was due to the dusty occupation?—No, I

do not think you could. I do not think you would be justified in saying it was due to the dusty occupation. You would know that the dusty occupation was a contributing cause, but from an ordinary examination of the chest in the early stages you could not tell any difference. The emphysematous condition is much more likely to begin earlier in life with people working at a dusty occupation, as I say.

7382. But supposing a case came to you in the later stages would you be able to say it was due to the occupation?—Probably, if you got a history of the case for years.

7383. In the earlier stages would a man be incapacitated from his work?—He may be temporarily.

7384. For how long a time?—My average gives me two months in cases of bronchitis.

7385. In the later stages might he be incapacitated all through the winter perhaps?—Yes, depending entirely on the severity of the winter.

7386. And ultimately he may be prevented from working altogether, I suppose?—Ultimately he may be prevented from working altogether. The average age at which the bronchitic cases came under my notice was 44½ years, and the average age at which the phthisis cases came under treatment was 31 years.

7387. Do you generally find phthisis among the roughers and hacklers or amongst the spinners?—Chiefly among the hacklers and spinners.

7388. Are the spinners as a class younger than the roughers and hacklers?—Yes.

7389. Therefore whatever disease you find amongst them you would expect to find at an earlier age than the diseases prevalent amongst the other classes, would you?—Generally speaking the average age of spinners suffering from bronchitis is 40, and the average age of spinners suffering from phthisis is 30. The average age of hacklers suffering from bronchitis is 53½, and for phthisis 44½. These are cases of temporary incapacity. The ages of the hacklers range from 24 to 75; the ages of the spinners range from 19 to 70.

7390. (*Mr. Cunynghame.*) Are hacklers particularly subject to phthisis?—My impression is that they are.

7391. What figures can you bring to show that?—I can let you have the total number of chest diseases treated at the infirmary and the number of workers.

7392. May I take it that there is a good deal of phthisis and bronchitis in Belfast?—Yes, a good deal of phthisis and bronchitis in Belfast.

7393. Above the average of Ireland in general?—Yes.

7394. To what do you attribute that tendency in Belfast?—First the climate, secondly I think the occupation, thirdly, dietetics, and fourthly the hygienic arrangement.

7395. You mean that the people do not live in a sanitary way?—They do not live in a sanitary way, and they do not take proper nourishment, they drink too much tea, and I think in a small percentage of cases alcohol contributes.

7396. Are they badly clad?—Yes. For instance the spinners stay in a wet hot room, and in the winter time come out into the cold with only a shawl thrown over their heads and shoulders, with their chests uncovered.

7397. Taking the hacklers, who have a good deal of phthisis, how much of that phthisis would be due to dust and how much of it would be due to general causes?—I think the dust would probably be the exciting cause—first the neglected bronchitis—not taking proper care in the earlier stages, either of bronchitis, or when they began to feel the effects of phthisis, with

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L.R.C.S.*

Mr. R. Hall, the result that the person is not able to battle with
L.R.C.P., the disease.
L.R.C.S.

7398. What care would you have them take for instance in the earlier stages?—To cease the work altogether temporarily it might be, for a few months.

7399. And to wrap up better and to take better nutriment?—Yes, and to be educated how to live. The mill workers' houses generally have not a window open; they are afraid of air according to my experience.

7400. And for people in that condition the best thing would be as much air as possible, would it not?—As much as possible.

7401. (*Professor Allbutt.*) Do these people adopt any preventive measures, such as respirators and so on?—They will not wear them.

7402. (*Mr. Cunynghame.*) At all events at present your figures seem to show that there is amongst hacklers rather an abnormal amount of bronchitis and phthisis, but you do not show the quantum?—Yes.

7403. But your impression is that the whole thing is getting much better in Belfast, is it not?—Yes, that is my impression; we do not get bronchitis of such a severe type as we did.

7404. And as far as occupations are concerned the mills at all events are getting healthier?—All the mills I have been through appear to be wonderfully healthy.

7405. Looking at the mills, so far as you saw them, would you be rather surprised to find they were giving the people bronchitis?—Yes; you would say the mills could not be entirely the cause, that there must be some other contributing element.

7406. (*Dr. Legge.*) You laid emphasis in your evidence as to the difficulty in the earlier stage of distinguishing between bronchitis due to dust and ordinary bronchitis, though you said that in the later stages you might. How many years does it take before the earlier stage passes into a well defined later stage when you can recognise it?—The average age of total incapacity is 44½ years. You do not generally find a patient suffering from ordinary bronchitis incapacitated at anything like so early a stage as that.

7407. What is the length of total incapacity?—The duration range of the illness is 1 to 15 years of total incapacity in bronchitis.

7408. Fifteen years would be an unusual time, would it not?—I think so; the average duration I should think would be five to six years. My figures give me five years and six months, but the extreme range as I say is 1 to 15 years in bronchitis. The duration range in phthisis is 1 to 6 years, and the average duration is two years and five months. Of course you find bronchitis and phthisis associated nearly all the time, but phthisis later becomes the predominant symptom.

7409. Are the symptoms you get bronchitis and emphysema?—Bronchitis first and then ultimately emphysema.

Mr. RICHARD JONES, M.D., called and examined.

Mr. R. Jones, 7424. (*Mr. Cunynghame.*) Have you some experience
M.D. with regard to diseases amongst people working in slate quarries?—Yes.

7425. Where was that acquired?—At Blaenau Festiniog, North Wales.

7426. Have you practised there as a medical practitioner?—Yes.

7427. Have you been a good deal employed by the workers there?—I am the workmen's doctor.

7428. Do you act for the owners as well occasionally?—No, I only act in any emergency. The owners have a hospital for accidents which they support entirely, but the men pay me. The men pay the doctor so much per month.

7429. And the owners only pay for the keep and the nursing in the hospital, I suppose?—Yes.

7430. Have you written some papers upon this subject?—Yes, I read a paper which embodies the evidence I gave before the Merioneth Commission in 1895.

7431. Will you kindly show the Committee the

7410. Do you recognise definite fibroid phthisis as due to the inhalation of dust?—My experience of the mill workers is that they very rarely get fibroid phthisis, and if they do it practically has been due to other causes than dust—badly resolved pneumonia or other causes of that nature.

7411. You do not recognise the bronchitis condition as being a stage in the fibroid condition?—I do not, not with mill workers.

7412. Have you made many post mortem examinations?—Yes, I have seen a good number.

7413. Would you describe the typical condition of the lungs of a flax worker who had been a chronic sufferer?—The lung is emphysematous in the majority of cases when they are advanced in years, it is black and very much discoloured owing to carbon, I suppose, and occasionally there is a dilated bronchus. That is not the case in all cases; I should say in not more than 4 per cent. would you have dilated bronchi, and the remaining portion of the lung would be full of mucous.

7414. When you cut into it with the knife what do you find?—It is pretty sodden, but not gritty.

7415. Microscopically, what do you find?—I have not examined microscopically at all.

7416. And you do not know whether there is fibrosis?—I do not; it is not perceptible. At a later stage there is dilatation of the right side of the heart.

7417-8. Are you familiar with forms of phthisis in which you do not find tubercle bacilli?—Occasionally you have to look for a long time before you get the bacilli, that is although you have definite signs.

7419. Do you mean that you have symptoms of phthisis, and that you look from time to time over a period of months and do not find bacilli?—No, it is not a condition like that, it is merely the difficulty of finding them in the quantity of expectoration. I may tell you that the cases are not diagnosed as phthisis in this table till proved to be so.

7420. Is the subject of mechanical bronchitis due to flax dust much discussed amongst medical men?—I do not think it is; they take it for granted with regard to a flax worker.

7421. (*Professor Allbutt.*) Speaking as a physician examining an individual patient, I understand you would say to one working in dust and who had begun to suffer from bronchitis, "You ought to lie up for some weeks or months lest you should ultimately become incapacitated"?—Quite so.

7422. Would you be prepared to say in an early case of this kind that the bronchitis was so far definitely the result of the occupation that it might be regarded as a trade incapacitation?—No; I would not be prepared to say so, though my impression might be so.

7423. In a question as to who must bear the cost you would not be prepared to testify against the employer?—I do not think it would be acting straightly if you were to be emphatic on the subject.

evidence in the Appendix to the Report of that Commission which you prepared? Does it show the death rate among quarrymen to be higher than that of the average population of the district?—That table refers to the age of death. It is lowest amongst those employed in the slate mills.

7432. Do slate quarries include mills and all kinds of employment?—Yes. Those employed in the mills where most of the dust is to be found have a less average age at death than most of the workers.

7433. The figures are:—Quarriers 47, rock men working underground 48, labourers 54, engine drivers, platelayers and weighers 60?—Yes.

7434. So that your conclusion is that the engine drivers, platelayers and weighers have a longer life than the quarriers?—That is so.

7435. That is including death from accident, is it?—Yes.

7436. If we exclude death from accident do you find the same proportion?—Yes. Those working in the slate mills have a less average age at death.

7437. And is the difference more striking of late

years than in the previous years?—Yes, I took an average of ten years.

7438. How do you account for the fact that these statistics vary so much, and that in some years the quarriers have nearly the same death age as others, and in other years it is very different?—It is rather difficult to explain, but I think it is partly accounted for by the fact that we have epidemics of pneumonia in our district. In 1889 there was a very severe epidemic of pneumonia which may have helped to vary the figures.

7439. (*Professor Allbutt.*) Was that an infectious pneumonia?—Yes.

7440. (*Mr. Cunynghame.*) And in that year the death age of the enginemen went down I see?—Yes.

7441. And the year 1891 is a bad year, is it not?—Yes. There is no doubt that pneumonia is a very prevalent disease amongst quarrymen. It seems to attack men who are employed in the mills and the rock men.

7442. But when you get epidemic years the figures are much the same, are they not?—I have not thought about it in that light.

7443. That rather seems to show, does it not, that whatever weight is to be attached to the dusty occupation as a cause of shortening life, at all events a considerable portion of it is due to other causes and not connected with dust?—I quite agree with you, yes.

7444. Would you say that the occupation of rock quarrying and employment in the slate mills was an occupation that decidedly exposed people to the danger of phthisis?—Yes, I think so. If you turn further on you will find tables dealing with the question of phthisis by itself.

7445. The number of deaths from phthisis out of 1,000 in the case of quarriers I see is 236?—Yes, that is over 14 years of age, at which age they are admitted to the quarry.

7446. But among rock men and miners it is only 140 deaths per 1,000?—Yes.

7447. And with labourers it is only 77?—Yes.

7478. And with others of all kinds it is only 40?—Yes.

7449. For what years are these statistics?—That is an average of 10 years from 1883 to 1892.

7450. Showing that the deaths from phthisis are far more frequent among quarriers than they are among other classes of the population?—I do not say that exactly.

7451. Than amongst others employed at the mines?—Yes.

7452. Turning to Table 9, of deaths from phthisis among those not employed at slate quarries, we have farmers, 70 only?—Yes.

7453. But then we get merchants and grocers, which come to 230, which is very nearly as bad as the worst class of quarriers?—Quite so, but amongst those may be men who have left the quarries, who have retired through bad health out of the quarry, men who would be classified as coal merchants and, possibly, any other occupation than quarrying, though they may have been quarriers up to say 40 or 50 years of age.

7454. Still, on the other hand, there may be rockmen and miners who have gone into those professions which would to a certain extent neutralise that figure?—Yes; but, as a matter of fact, this figure of 236 is higher than the average figure amongst farmers.

7455. Then you give masons, joiners, shoemakers, bakers, and stonecutters, which is a very high figure?—Yes, but not so high as the 236.

7456. Among females the number of deaths from phthisis varies in an extraordinary way, does it not?—Yes.

7457. In 1890 it was 246, higher than the worst year of the quarriers, and two years afterwards it sunk to 144?—Yes. Quite so.

7458. Would one chiefly rely on Table 8 in endeavouring to establish the fact that quarriers have more tendency to phthisis than other people employed in the mine?—Quite so.

7459. Supposing one examined the separate years instead of taking the total, should not we find the figures inclined to vary?—Yes, I am certain you would,

because on thinking over it now I find a number of men in my place suffering from chronic phthisis—more than I have seen. *Mr. R. Jones, M.D.*

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7460. Even though the conditions of health are improving?—Yes. And still phthisis is there.

7461. And not diminishing?—I do not think it is diminishing; it is about the same; the rate is something like 1·7 or 1·8 per 1,000, which is high.

7462. Have you ever held any post-mortems on these men?—No, no post-mortem has ever been held; we depend entirely on clinical examination. There is not a single case where all these conditions have been verified by post-mortem.

7463. (*Professor Allbutt.*) There is strong local prejudice against it, is there not?—Yes. A man died last week, and I tried my best to get a post-mortem examination, but there was no chance of getting one.

7464. (*Mr. Cunynghame.*) In Table 15 in the Appendix to the report on Comparative Mortality you get amongst males in England and Wales a figure of 220 per 1,000 deaths, do you not, from phthisis?—Yes.

7465. 308 amongst stone masons and slate quarriers?—Yes.

7466. And 204 amongst slate quarriers, which are rather less than amongst all males in England?—Yes, that is taking slate quarriers only.

7467. And the Festiniog non-quarriers are much over the average, how do you account for that?—Because, as I have said, they are men who have left the quarries and are put down as coal merchants, shopkeepers, and so on.

7468. How do you account for the fact that the Festiniog slate quarriers, have a less average than the average of all England?—It does work out in that way, but the figure includes the whole of the quarrymen, not the men working in slate dust only.

7469. But it is curious that taking the men as a whole they are positively more free from phthisis than the average of the population, are they not?—Yes, quite so, as a whole they die less from phthisis than other inhabitants, but there may be the explanation of the men leaving the quarries and being classified otherwise.

7470. It would be difficult to put down phthisis as a disease arising from the occupation if upon the whole the figure is less than the average population, would it not?—Quite so, but that figure, of course, refers to all the quarrymen.

7471. Then taking quarrying as a whole, you cannot say that phthisis is a specific disease arising from it, can you?—No; only amongst the particular class.

7472. What is the particular process of slate quarrying which is particularly likely to produce phthisis?—The men who are employed in the large slate mills.

7473. (*Professor Allbutt.*) By phthisis do you mean tuberculous consumption?—It includes all forms of phthisis—everything.

7474. Dust bronchitis and emphysema?—No, it does not include emphysema or bronchitis.

7475. Do you recognise such a thing as dust bronchitis?—I do not think so.

7476. We may agree broadly on some name for this discussion?—Fibroid phthisis would include it.

7477. Tuberculous phthisis and dust phthisis are included, are they?—Yes.

7478. (*Mr. Cunynghame.*) But that does not come under the head of quarriers in Table 8, does it?—Yes.

7479. What is the operation in the slate mills. What is the difference between quarrying and being employed in the slate mills?—Quarrying means getting the stone in big blocks from the quarries, after which it is sent out on lorries. The blocks are, perhaps, three or four or five yards long, and two or three feet in depth. These are brought to the slate mills, where they are split up into smaller pieces, put on the sawing tables, and sawn into different lengths. They are then split up with chisels into about one fourth or eighth of an inch. After that they are put under the dressing machine and dressed by men who stand by the machine, and then they are put by and are ready for use on the roof.

7480. They make roof slates, and I suppose they make slates for urinals and such like?—Yes.

Mr. R. Jones. 7431. But what you are dealing with are house slates, I presume?—Yes.

5 Feb. 1907. 7432. What makes you think that the phthisis caught in these particular mills is due to dust rather than to other general causes?—Of course I have already said that we depend entirely upon clinical observation.

7433. And we have had the figures which incline you to think it—what else is there?—We find the men suffering from a low form of pneumonia. They perhaps get an attack of pneumonia, they recover and go back to work, and then gradually lapse into a state of incapacity. They have a cough, then pains and shortness of breath, there are no cavities as a rule formed in the lung, but there is a sinking of the chest on one or both sides, the men are disabled, and you examine for tubercle bacilli, and do not find any present.

7434. Do you find any slate dust in the sputum?—That I have not looked for. There is no doubt there must be, because they are working in a dusty atmosphere.

7435. What proportion do the men who are engaged in these mills represent. It is the milling, not the quarrying, which is the dangerous occupation, is it not?—Yes, of course you do get dust in quarrying.

7436. As a whole we have it that the occupation is not a dangerous one as regards phthisis—it is only one part and apparently it is the mill part which is the dangerous part, it is not?—That is my opinion.

7437. What proportion does the number of men employed in the mills bear to the whole number of quarrymen. Would the figures be given anywhere?—I believe the figures are given by Dr. Foster in one of the appendices to the Report of the Commission, but I should think more than half the men would be employed underground. Our quarries are underground.

7438. And that is not a dangerous occupation I understand you to say?—I do not say it is not dangerous, but there is not so much dust.

7439. The whole thing cannot be more dangerous than the occupations of ordinary life, can it?—Quite so.

7490. From your clinical observations, have you found any distinction between the amount of disease amongst underground workers and mill workers?—Yes.

7491. (Chairman.) Do you ever come across a case of this sort of phthisis amongst the underground workers as distinct from the mill workers?—I think we do.

7492. Although it is much less prevalent?—Yes. The men who go to the quarry, under the Factory Act go at 14 years of age; the men who go to work underground come from the country between 18 and 20 years of age—they have been farm labourers all their lives before coming to the quarries—they come in as labourers, and are put on as apprentices under the rock men. They have a great advantage over a boy of 14 who goes into an atmosphere of dust, so that I believe is a factor in their being better able to withstand the dust.

7493. But cases do sometimes occur, do they?—Yes, they do.

7494. (Mr. Cunynghame.) You can give a description, can you not, of the appearances of this disease?—Yes.

7495. (Professor Allbutt.) Do you agree with this: "Primarily the result on the lungs of the inhalation of fine angular and spiculated microscopic particles of slate dust is of an inflammatory nature"?—Yes.

7496. Would you call that bronchitis or a fine pneumonia?—I should call it a form of pneumonia.

7497. And the mill men, I understand, show a larger percentage of pneumonia and of ultimate fibroid phthisis than their fellow workmen?—I believe so, but as regards pneumonia, it is the men who work underground who show the greatest percentage.

7498. That is ordinary pneumonia, I suppose?—Yes.

7499. The splitters are particularly men exposed to this disease, are they?—Yes.

7500. (Mr. Cunynghame.) Have you an exhaust system of ventilation?—No.

7501. (Professor Allbutt.) You produce, do you not, a drawing of the grains of slate dust taken from a

ledge in a slate mill and highly magnified, which are found to consist of irregular spicular and angular particles?—Yes.

7502. The finer the dust the more apt it is to penetrate the inner parts of the lung, I suppose?—Most certainly.

7503. Will you describe the typical symptoms of well-marked cases of this kind?—As I have already said, a man may get pneumonia of a very low type from which he would recover apparently, and go to work; in time he develops a cough, and, as a rule, the men working in these mills are very thirsty, and drink a good deal to relieve it. Then there would be shortness of breath, but no blood expectoration, as a rule, but great lassitude. In some you will find emphysema.

7504. I suppose you would find some fever?—Yes.

7505. What do you find in the lungs?—We find almost always complete consolidation. The consolidation of the lung, I believe, is more rapid in the cases of pneumonia we have than you would expect to find generally.

7506. Could you distinguish it from common croupous pneumonia?—It would be lobular or croupous pneumonia—undistinguishable.

7507. If a man recovers do you anticipate a repetition of the attack?—I do.

7508. So that gradually the lung becomes more and more vulnerable. After a second or third attack, do you expect then there would be any permanent signs?—Yes.

7509. Will you tell us what these are?—There would be a complete fibroid condition of the lung.

7510. Then you get the fibroid phthisis, do you?—Yes.

7511. All these acute attacks are prior to the permanent fibrosis?—Yes.

7512. Are these acute attacks a part of the disease?—Yes. I have a man in my mind now who has had three attacks of pneumonia, whom I have examined several times for tubercle. As it happens, he is just recovering from another attack now, and he has not worked yet. I sent his sputum up to the Clinical Research Society, and they have discovered there is tubercle bacilli in the sputum for the first time. That man has been ill, off and on, for four years.

7513. The tubercle supervenes at the later stages?—Yes.

7514. But in the first stage, you would not be able to distinguish the illness from ordinary pneumonia?—No.

7515. How would you be able to distinguish more permanently?—A man would become very pale, suffer from shortness of breath, and from great lassitude; he would say, "I am too bad to work"; but on looking at him he might look fairly well. There is great wasting as a rule, and when you examine the lung, you find fibrosis, and you verify his statement.

7516. (Mr. Cunynghame.) How are you to distinguish the lassitude from malingering?—By the physical signs.

7517. (Professor Allbutt.) Will you tell us what these are?—Defective expansion of the chest on one or both sides possibly; there would be sinking of the intercostal spaces, perhaps an intensity of breath, but no cavities, as a rule, are to be found. The dulness would be increased; it would not be complete dulness, but comparative dulness compared with a healthy lung.

7518. Bilateral?—Yes, as a rule.

7519. Whereas fibroid phthisis not due to dust is generally unilateral, is it not?—Yes.

7520. You do not anticipate much difficulty, in chronic chest diseases, in distinguishing a case of dust origin from one of a more ordinary description?—I think there would be a certain amount of difficulty, but with the whole history of the case, there would not be very much, particularly if you found those conditions—the tubercle bacillus absent, and the man employed in a slate mill.

7521. And even when the tubercle had supervened, it would not alter your opinion, I take it?—No, it would not.

7522. (Dr. Legge.) How many of these cases have

you had under your observation?—I have a list which I can hand in. One of the men named in that list is dead, but the others are alive, and are suffering from the symptoms I have described.

7523. How long have you been in practice there?—Twenty-six years.

7524. Has this disease been going on all the time?—Yes.

7525. So that you have seen 50 or 60 cases at least?—I think I have seen altogether 104.

7526. Are there other medical men practising in your district?—There are. There is my late partner, Dr. Robert Roberts, who wrote a paper on the subject.

7527. Are you all agreed as to the danger of the occupation?—Yes.

7528. As Medical Officer of Health, do you get a certificate of death?—Yes.

7529. How are the causes of death returned—can you tell me the different headings?—Phthisis, tuberculosis, pulmonary—no bronchitis in it—phthisis pulmonaris, general tuberculosis, fibroid phthisis.

7530. Do you get such a term as slate quarriers' phthisis?—No.

7531. Can you tell us what slate is chemically?—There is a lot of silica in it, and aluminium.

7532. Do you know what the proportion of silica is?—I think about 60 per cent.

7533. Is there any special slate in your district which differs from other slate in its hardness, which accounts for the special results in your district?—Yes, our slate is the silurian deposit, which is much softer.

7534. Is the same condition of things going on in Carnarvon in the slate mills there, do you think?—I should think so. But I may tell you my figures deal entirely with the district I work in.

7535. Is yours an important slate quarrying district?—Yes, we have the largest slate mines in the world in our district. We work under a different Act of Parliament to others. There is no doubt, I think, if the cubic space which the men work in were not so great, there would be a worse condition of things.

7536. You said you can distinguish between ordinary tuberculosis and fibroid phthisis, but supposing a patient comes to you at a time when he has tubercle bacilli present in his sputum, how can you say that he

has fibroid phthisis as well. Would a case like that present much difficulty to you?—I should think it would. Of course, you would go on physical signs and come to the best conclusion you could, but nothing less than a post-mortem would satisfy you.

7537. But as a general rule a man in that condition would have sought your advice before coming to that stage, so that it is not likely to happen in practice, is it?—I should think not.

7538. Can you say how long it is a man continues to work in the slate mills before he develops a pneumonic attack?—I could not tell you how long, but I have often seen young men from 20 to 25 years of age.

7539. I think you said they begin work at 14, did you not?—Yes.

7540. Does it take that length of time to develop?—I should think so, but after a man gets the first attack of pneumonia it takes less time, of course.

7541. Do you get men commencing work at these slate quarries and three weeks afterwards getting an attack?—No.

7542. So that the dust does not set up an acute attack?—I do not think it does. If you take the nature of the dust it is clayish, and no doubt a lot of it inhaled would be expelled. That is, I believe, one of the causes of the men being thirsty.

7543. So that you have to regard the acute pneumonia as simply evidence of a very slow chronic process, I suppose?—It may be. There is no doubt in my opinion that the slate dust is one of the factors at any rate in the prevalence of pneumonia; how far it causes it I do not know, but there is no doubt it is one of the factors.

7544. (Mr. Cunynghame.) As I take it the figures given by you show a certain amount of increased phthisis among these mill hands, but not apparently such an enormous proportion, or a very great proportion more than there is in the population at large?—No, with this explanation, that amongst the population at large there may be men who have been slate workers.

7545. I meant among the population of all England—the proportion is not so enormous, is it?—It is not.

7546. It is not such a severe case, for instance, as the steel grinders or ganister men, is it?—No, but there is no doubt it is a factor in these chest affections; and, of course, the nature of the dust is not so hard, which perhaps explains it.

Mr. J. T. HARTILL, L.R.C.P., M.R.C.S., called and examined.

7547. Have you been a general practitioner since 1869 in Willenhall, near Wolverhampton?—Yes.

7548. Are you also Poor Law Medical Officer for Willenhall?—Not now. I was from 1876 to about 1887.

7549. The chief trades in Willenhall are lock, key and curry-comb making, are they not?—Yes, and castings in iron and brass—especially iron.

7550. In the hand-made lock trade there is not much dust, is there?—No, there is not.

7551. But in the making of locks and keys by steam and other power, and in the iron casting trades, is there dust?—There is.

7552. That dust all arises apparently from grinding and polishing by leather and emery bobs, does it not?—Yes, and on grindstones.

7553. It is grinding metals that produces the dust, is it?—Yes.

7554. Do you think fibrosis of the lung can be easily diagnosed?—I think fibrosis of the lung can be diagnosed, but not easily as uncomplicated dust-produced fibrosis.

7555. After death, I suppose it would be easy to tell it by post-mortem?—Yes, in many cases it would.

7556. But I suppose if people got more accustomed to the necessity of diagnosing dust phthisis as compared with other phthisis they would probably be able to do it, given the life history of a man, supposing every question was answered truly?—I should very much doubt it.

7557. The Committee have been told by a good many doctors that though an ordinary practitioner might

find some difficulty at first, when he began to get accustomed to it it would not be so difficult, given the life history of the patient?—I quite understand that some doctors might take that view, but personally I think there would be considerable difficulty, and I have reasoned the matter out in my own mind.

7558. Have you seen cases of colliers' asthma?—Plenty of them.

7559. What is the cause of that?—Coal dust.

7560. Does that set up phthisis?—No, I do not think it sets up phthisis.

7561. What does it set up?—Ultimately it sets up chronic bronchitis.

7562. Have you seen anything of brass casters' disease?—No; nothing that I could definitely speak of.

7563. Nor any disease got in the casting of iron apart from grinding and polishing?—No, I have not.

7564. What sort of grinding is done at Willenhall. Have you seen the machinery there?—I have.

7565. What is it like?—Large grinding stones, and there is dry and wet grinding on them.

7566. What kind of things do they grind?—Tools—chiefly tools that are used in the shops themselves. They do not manufacture tools to a large extent.

7567. Then the men are not grinding all day, are they?—Yes; I think some of the factories are large enough for that. They also grind the rough edges off large castings.

7568. And then what comes off consists of sand and silicious dust of the iron, I suppose?—Yes.

Mr. J. T.
Hartill,
L.R.C.P.,
M.R.C.S.

Mr. R. Jones,
M.D.
25 Feb. 1907.

J. T.
Hartill,
L.R.C.P.,
M.R.C.S.

eb. 1907.

7569. Do they use hoods and ventilators?—Yes, in most of the shops they do. I know a very large quantity of dust is collected in some of the shops from the fans.

7570. What is the present state of health at Willenhall with regard to consumption?—There has been a fall in consumption in recent years, but at the present time there is a tendency to rise slightly.

7571. To what do you attribute that?—The rise is not large enough to draw any general conclusions. It may be possibly due to the development of the casting trades, that is to say, there may be a greater pre-disposition to it, but on the other hand the rise is not sufficiently marked over a period of a few years to say so with certainty, and the population is not large enough to draw any general conclusion from.

7572. (Chairman.) Have you had under your immediate care any cases of colliers' phthisis?—Yes, plenty.

7573. Have you no doubt that that phthisis is due to the inhalation of coal dust?—Not the slightest. If I use the term colliers' phthisis I should say distinctly there is tuberculosis in a collier's lung, but when I speak of colliers' asthma or colliers' consumption, as it is locally called by the colliers themselves, there is no tubercular deposit at all—it is simply bronchitis.

7574. In those mines with which you are acquainted is there much stone mixed with the coal?—No. I ought to say there is practically no coal mining in the immediate neighbourhood of Willenhall now. I am speaking of the earlier portion of my life, when I had a good deal to do with the miners, from the year 1869 to 1884 or 1885.

7575. But in recent years have you come across any cases yourself?—Yes, because in the Short Heath district there are still some cases from the Essington mines. When the miners left Willenhall they left behind them their old and infirm people, and those who were broken down by such complaints.

7576. In those mines is there much stone mixed with the coal?—No, I should say not. I should say in our neighbourhood the ironstone lies below the coal, but for some years the ironstone has been under water. The strata surrounding coal consists of shale, a moist slatey clay.

7577. There are clean seams of coal, and the miner drills in nothing but coal, and there is no rock of any sort—is that so?—Sometimes you have to go through the rock to get to the coal.

7578. The point I am trying to get at is this: Are you sure that it is coal dust, and no other dust, that gives rise to this bronchial affection?—I think so. I have seen dozens of cases of colliers' lungs post-mortem, and I have seen them permeated with black material which has all the appearance of coal dust, and in the expectoration coal dust is visible.

7579. Do you think that that is a sufficient proof that the asthma is due to that cause?—Yes, I think so. Even at the present time I know a man 76 or 77 years old, who has probably not been in the mines for 20 years, is still bringing it up.

7580. (Professor Allbutt.) You have, you say, "seen many cases of so-called fibroid phthisis, or consumption, but have never so described a case myself." Do you mean you would call it by some other name?—The cases that have been commonly regarded as fibroid phthisis, I believe to be tubercle.

7581. Is fibroid phthisis without tubercle unknown. do you think?—Yes, practically; you can get fibroid thickening without tubercle.

7582. Is colliers' asthma a fibroid thickening of that kind?—There is generally some fibroid thickening, but not any material thickening with colliers' asthma.

7583. Have you seen cases where there is material thickening, and, if so, why should not you call them fibroid phthisis if you have?—Perhaps I may be wrong in saying so, but I have always regarded the word phthisis as equivalent to pulmonary tubercle.

7584. If I substitute, then, the words "fibrosis of the lung"—you have seen many such cases?—Yes, I have. You are speaking of fibrosis of the lung independently of tubercle?

7585. Yes. Would colliers' asthma or consumption

be chronic bronchitis with more or less fibrosis?—Yes.

7586. I do not quite follow your *précis* when you say: "There is no reason why a coal miner's lungs should not be invaded by tubercle." That does happen at later stages, does it not?—Yes, frequently.

7587. "In which case, although the expectoration might be purulent and coal dust laden, I should describe it as pulmonary consumption, and the tubercle bacillus would be the cause of it." Is not this, after all, very much a matter of nomenclature, and not of practical clinical work? For example, a man breaks his leg in an accident, and it may happen that some such intercurrent affection as erysipelas supervenes, but this would not take the case out of the category of an accident, would it?—No.

7588. Therefore I do not see why the supervention of tubercle bacillus at a later stage takes the case out of the category of a pulmonary disease due to coal dust?—The difficulty I foresee is that you would not be able to say when the tubercle invaded the lung.

7589. That is a different point, but I do not see why it should not be classed as colliers' lung with secondary poisoning by tubercle?—Quite so.

7590. Cannot you go further and say that had not it been for the fibrous degeneration of lung he would not have had that secondary tuberculous condition?—No, I cannot; but given a fibrous condition of the lung, he would undoubtedly be more likely to become tuberculous.

7591. So that really the man's malady is originally due to the dust, is not it?—No, I would not go so far as that.

7592. Where would you stop?—I think you must come, distinctly and definitely, in contact with the tubercle bacillus first.

7593. But we are all breathing tubercle bacilli from time to time, are we not?—Possibly. I am not prepared to affirm or to deny it.

7594. And if already one has colliers' phthisis, one is much more apt to make a home for the tubercle bacilli, is it not so?—I admit that.

7595. Then I do not quite see your point that the case ceases to be one due to dust, because subsequently it becomes complicated with tubercle?—But I say the point is, that a man would not be disabled until he gets the tubercle. I take it, it is incapacity you are dealing with?

7596. Does not colliers' lung, apart from tubercle, incapacitate?—At a later stage it certainly does, where you have chronic bronchitis.

7597. And at that stage he is very apt to become subject to tubercle also, is not he?—Possibly—I cannot say; I have seen many colliers late in life who have had tubercle.

7598. You say: "Consumption accompanied by fibrosis of the lung"—that is to say, pulmonary tuberculosis—"ought not to be a disease for compensation unless the fibrosis without the consumption can be demonstrated to be incapacitating in any given case by itself"?—That is the view I take.

7599. In a case of a man coming before you to know whether he is really an incapacitated man, would you make it your opinion dependent on a microscopic examination for tubercle?—I can conceive a man being incapacitated from fibrosis with other complications which are not tubercular—for instance, bronchitis.

7600. But confining ourselves to bronchitis and fibrosis admittedly due to dust, on a man's employer asking you whether a man was incapacitated or not, would you say, "I must examine his sputum first, or get a skilled pathologist to examine his sputum very carefully, and if tubercle is there, he is not incapacitated by a dust disease"?—It would not be by a dust disease alone.

7601. It is a difficult position, is not it?—Yes. I am afraid that would be really the bone of contention in all these cases.

7602. (Chairman.) Do you hand in a table showing the deaths of persons above 17 years of age in Willenhall in years indicated from consumption of the lungs?—Yes.

The Table was handed in, and is as follows:—

DEATHS of Persons *above 17 years of age*, in Willenhall, in years indicated from Consumption of the Lungs.

Mr. J. T.
Hartill,
L.R.C.P.,
M.R. .S.
25 Feb. 1907.

| Year. | Total. | Males. | Females. | Of which Fibroid Phthisis. | Age. | |
|------------|--------|--------|----------|----------------------------|----------------------------------|--------------------------------|
| | | | | | Males. | Females. |
| 1889 | 11 | 6 | 5 | " " " | 0 | 0 |
| 1890 | 17 | 12 | 5 | " " " | 36 | 0 |
| 1891 | 10 | 7 | 3 | " " " | 0 | 0 |
| 1892 | 9 | 5 | 4 | " " " | 0 | 0 |
| 1893 | 17 | 11 | 6 | " " " | 48 | " |
| 1894 | 16 | 10 | 6 | " " " | 0 | 0 |
| 1895 | 6 | 5 | 1 | " " " | 44 | 0 |
| 1896 | 16 | 6 | 10 | " " " | 43 | 62 |
| " | | | | | 30 | |
| 1897 | 15 | 9 | 6 | " " " | 0 | 0 |
| 1898 | 21 | 15 | 6 | " " " | 0 | 54 |
| 1899 | 26 | 18 | 8 | " " " | 44 | 45 |
| " | | | | | 46 | |
| 1900 | 29 | 17 | 12 | " " " | 57 | 52 |
| 1901 | 26 | 14 | 12 | " " " | 59 | 0 |
| 1902 | 23 | 14 | 9 | " " " | 0 | 64 |
| " | | | | | | 49 |
| 1903 | 22 | 13 | 9 | " " " | 39 | 59 |
| 1904 | 19 | 15 | 4 | " " " | 41 | 0 |
| " | | | | | 49 | |
| 1905 | 19 | 13 | 6 | " " " | 0 | 0 |
| 1906 | 27 | 19 | 8 | " " " | 0 | 0 |
| Totals - - | 329 | 209 | 120 | — — — | 12 average age, 44½ years. | 7 average age, 55 years. |

7603. Do you adopt the ordinary line of differentiation between fibroid phthisis and other cases of consumption?—For statistical purposes, every case of death which is registered as fibroid phthisis, as

Medical Officer of Health, I treat as a case of pulmonary consumption, whether it is so intended or not, and it is so classed.

TWENTY-FIFTH DAY.

Wednesday, 27th February 1907.

PRESENT :

Mr. HENRY CUNYNGHAME, C.B. (*in the Chair*).
Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. W. F. BROOK, F.R.C.S., called and examined.

Mr. W. F. Brook, F.R.C.S.
27 Feb. 1907.

7604. (*Chairman.*) Mr. Brook, you are Fellow of the Royal College of Surgeons, and live at Swansea?—Yes.

7605. What is your practice here?—I am a consulting surgeon.

7606. To the hospital?—To the hospital and in private practice.

7607. You, I believe, have records of cases of what the layman may term pitch diseases?—Yes.

7608. How have they come under your notice?—When they have come into the hospital.

7609. You have no practice among the men?—No, I have not seen them until they are inside the hospital. Not even in the out-patients' department have I seen them. I am very rarely present there, and I have never seen them there.

7610. You only see them when very bad?—Yes, and that is very rarely.

7611. Will you tell us in your own language—will you give us a description of this malady that comes from working in pitch, and give us your reason for thinking it is the pitch that does it?—To begin with, I must tell you that it is only to my certain knowledge that two bad cases have come under my care at all.

7612. In how many years?—Let me see—13 or 14 years. It is possible there have been others, but I have not been able to find them. Unfortunately the records in a provincial hospital are not kept in a way that enables cases to be easily traced.

7613. There are two cases you are going to tell us of?—Yes.

7614. Will you kindly describe the symptoms as you saw them?—Well, these two cases both came under my care with obvious cancerous growths in the scrotum—epitheliomatous ulcer of the scrotum. Practically a disease which is akin to what is known as chimney-sweeps' cancer.

7615. How do you know it is?—My ground for saying it is that chimney-sweeps' cancer of the scrotum is a well-recognised form of epithelioma, and is caused by, or is supposed to be caused by, irritation by soot.

7616. You have never seen a chimney-sweeps' case?—Oh, yes, I have.

7617. Then you are able to compare?—Yes; that is practically the form—a well-recognised form.

7618. And some you have had an opportunity of actually seeing?—Yes.

7619. And in the men working in pitch you recognise similar symptoms?—Yes.

7620. Not through books, but from actual observation?—Yes. That is why I say it is quite possible I have seen more than these two cases. When I first came down to Swansea I may have seen cases that I presumed were chimney-sweeps' cancer, when possibly they were cases of pitch disease in which epithelioma had developed.

7621. Does chimney-sweeps' cancer exist still?—Certainly.

7622. A large amount of it?—I have not seen so much in Swansea as I saw in London.

7623. Would you describe it as just epithelioma?—Yes.

7624. Is that a word for cancer?—It is a form of cancer.

7625. Dr. Legge will take you more on details. Unfortunately Professor Allbutt is not here yet, so I am struggling with some degree of ignorance. How do you know it is cancer?—From the clinical appearance and behaviour of the growth.

7626. There are no specific bacteria you can recognise?—No.

7627. So it is only from the general appearance that one says cancer?—Yes, and also the microscopic appearance.

7628. It might turn out to be some new disease, or is it certain it is ordinary cancer?—I should say it is absolutely certain. I think perhaps I am misleading you. These warts, as they are called down here, are not cancerous necessarily. It is only occasionally or rarely they take on a cancerous growth, and it is only on those occasions I have seen them.

7629. If they don't take a cancerous growth are they of such a character that they have to be cut out?—I should think very rarely. I am speaking from my experience of these two particular cases that came before me, and also from what I have heard from other medical men. These two cases that came before me here simply on account of disease in the scrotum also showed evidence of skin disease elsewhere. That is to say, scars all over the men's faces, backs of the hands, and exposed parts, where ulcerations had healed of themselves. So I am quite convinced myself—though I cannot say it of my own observation—that these warts, or rather ulcers, have a tendency to heal without treatment at all. In other words, they are quite a simple form of disease.

7630. If you examined them microscopically you might find something?—I cannot say, but I do not think there would be anything very particular.

7631. Would they be of the same sort of ulcerous character that would be got through a severe burn by a man not in very good health?—I do not suppose microscopically you would see more. I have not examined them. All I can say is occasionally when this form of ulcer affects the scrotum the disease becomes cancerous.

7632. And develops into something practically indistinguishable from common cancer?—Yes.

7633. And is akin to chimney-sweeps' cancer?—Yes.

7634. Do you attribute that to something in the pitch?—Yes.

7635. Because they are exposed to something of a pitchy character?—Yes.

7636. You have not gone into the question whether it is due to creosote?—No; I should say something in the fuel. Probably the pitch contains something which is irritating.

7637. And probably soot contains stuff of the same irritating character?—I should say not so irritating, because the ordinary chimney-sweep is not liable to a simple form of ulceration.

7638. The chimney-sweep comes under the general class of cancer?—Yes.

7639. He does not get sores?—No.

7640. Can you tell us more than you have told us

now?—These two cases I treated to begin with by means of X rays, and I had an opportunity of observing the other growths, or, rather, other ulcers, their position and behaviour.

7641. Which you think may possibly have developed in the same sort of way?—Yes.

7642. I suppose the habit these men have of not washing has to do with it to a certain extent?—No doubt. I wrote to these men to come and see me, two days ago, and one man volunteered that the only way to avoid the trouble is absolute cleanliness.

7643. He admitted that himself?—He suggested it. The other one says, "I use hot soap and water every morning and evening," but I cannot help thinking he started using the hot soap and water too late.

7644. Is there anything else you would like to add that you think important to us?—I don't think so.

7645. (*Dr. Legge.*) Is this a form of epithelioma?—Yes.

7646. So when the cause is removed would there be incapacity?—No.

7647. Would there be likely to be a recurrence?—Not if thoroughly removed.

7648. Not after 15 years?—I don't see why there should be. Of course, there would be the same liability to fresh attack in the parts, particularly the vulnerable parts. I have had to remove the testicles as well as parts of the scrotum.

7649. Then the testicles adhered?—Yes.

7650. And it had broken down?—Yes.

7651. And were the glands in the groin affected?—I don't think so, as far as I can remember.

7652. How long ago was it?—About 1901—both in 1901.

7653. And are both at work still?—I saw both last night; or rather, one last night and the other two days ago.

7654. Was one called ———?—No; one ———. He had been working in what he calls the pitch mills, which he says are the worst part of the works, for 20 years. It is where they grind the pitch to powder.

7655. Did he say what works?—No; I am afraid I did not ask him. He noticed trouble in the scrotum starting with the ordinary wart 6 or 9 months before he came to see me, and when I saw him he was suffering from epithelioma of the scrotum, which involved the testicle, necessitating removal of the testicle and three parts of the scrotum. The other case is a man named ———.

Mr. J. D. DAVIES, M.B., C.M., called and examined.

7668-9. (*Chairman.*) Your name is Dr. J. D. Davies, of Trinity Place, Swansea?—Yes.

7670. What opportunity have you had of observing the pitch workers? What position do you hold here?—I attend some of the workers at the Graigola Works in Swansea.

7671. Are you employed by them?—I attend a good many.

7672. Are you employed by the employers or the men?—The workers.

7673. Is it a benefit society?—Yes.

7674. What is the name?—"The Primrose Lodge," a Shepherds' Lodge.

7675. How many members are there of this Shepherds' Lodge?—All the members of the lodge do not work at the works, but a large number of the men employed at the works are members of the lodge.

7676. Do you happen to know how many of the men at the works are members of the Shepherds' Lodge?—No, I don't.

7677. Now, you have observed injury to health through working in the pitch?—Yes.

7678. Would you kindly tell us what you observed?—The men who handle the pitch are sufferers from warts.

7679. What do you mean by handling?—Working in the pitch. I mean employed in the works and handling the pitch.

7656. Was he a grinder in the pitch mill?—Yes, he was also working in the pitch mill, and in his case a growth had been removed on two previous occasions. Of course I cannot say how thoroughly. I saw him in 1901, when he was suffering from epithelioma of the scrotum. He told me he had had two previous operations—one in 1900 and one 10 years prior to that—and after each one had had a recurrence.

7657. (*Chairman.*) Was your operation satisfactory?—Yes. I operated in 1901, and so far it has not recurred. Probably I removed it more widely than was done on the previous occasions.

7658. (*Dr. Legge.*) Would it be a fairly accurate way of describing the form of cancer as composed of epithelial cells, which, ordinarily growing outwards, take on a reverse direction and grow inwards?—Yes. The word "wart" is a misnomer in these cases.

7659. Have you ever examined the ordinary pitch wart microscopically and seen whether it resembles the common wart?—No, but clinically it does not. It starts as a little nodule in the skin, and almost immediately begins to break down and practically becomes an ulcer, a crust forms on the ulcer, which gives rise to the appearance of a warty growth. If the crust is removed the underlying ulcer is found to have a slightly raised edge, giving the appearance of the rodent ulcer. This, however, almost invariably heals.

7660. So when you said these men have these marks on their faces you don't mean they put acid or ointment on and so caused their destruction, but the natural process of the healing?—Yes.

7661. Have you ever seen a cystic condition of the growth?—No.

7662. Have you heard of it in the scrotum?—Not in the scrotum.

7663. Or on the body?—Only in the eyelids. It happened when I was examining one of these men that my friend Dr. Frank Thomas, ophthalmic surgeon, came in, and pointed one out to me. He will give you sufficient information on that point.

7664. Did you notice pigmentation of the skin?—Yes.

7665. Do you think there are other surgeons in the town who have removed these epitheliomatous conditions?—I think very probably.

7666. You don't know?—No.

7667. This condition has not been described to your knowledge in any paper?—No, I don't think it has. I am not quite sure, but I don't think it has.

7680. For instance, name some who do not?—Well, the pressmen. I cannot exactly say the number who do, but they are comparatively few compared with those who work in the works.

7681. Only a limited number of those employed who are exposed to the pitch?—Yes.

7682. Perhaps one in eight?—I should say less.

7683. One in ten?—I should say 20 or 30 in a works of 300.

7684. So it is from 7 to 10 per cent. of the people?—Yes.

7685. Beyond those 20 or 30 the others are not apparently in danger?—No, they are not.

7686. Now will you tell us what are the symptoms you have noticed?—Warts grow on the surface of the body exposed to the dust, I suppose it would be the dust of the pitch.

7687. Those warts are not what we commonly understand by warts?—Yes, exactly similar.

7688. Have you microscopically examined them in comparison with ordinary warts?—No, but they would be of the same structure.

7689. What makes you think that? They might be something more specific?—No; they are of epithelial growth, and ordinary warts are of the same growth. They could not be of different structure.

7690-1. What else have you observed? Are their

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eyes affected?—In some cases they are, owing to irritation from dust collecting round these warts.

7692. What is the matter with them?—Inflammation of the eyes.

7693. What else have you seen besides warts and inflammation?—I have seen ulcers round the bases of the warts.

7694. Have you known cases where it has gone on to a kind of cancer?—Yes, two cases.

7695. What are the names of the two men?—It is some years ago. I don't think I could tell you the names.

7696. Have you seen the cases yourself?—Yes.

7697. What is the appearance?—In one case, a case of cancer on the ear, deep ulceration, which had the characteristics of epithelioma. A case of this kind would go into hospital.

7698. And then you ceased to treat him?—Yes.

7699. But you saw him before?—Yes.

7700. Do you know what was done to him there?—Treated under X rays.

7701. No operation?—Not in the ear case. In the case of epithelioma of the scrotum there was an operation. The man died.

7702. These are the three symptoms you have seen—soreness of the eyes, warts, and cancerous growths?—Yes.

7703. You treat all the men in the Shepherds' Lodge?—Yes.

7704. What proportion of the men in such works as the Graigola Works—what proportion of the 300 men do you think are in any way affected by any one of these three—warts, eye troubles, and cancerous growths?—I believe all the men employed in the pitch department suffer from warts.

7705. That is rather a big order?—Yes.

7706. You think all do?—Yes.

7707. And their eyes?—No.

7708. Not in the case of the eyes?—No.

7709. And the cancerous growths?—Very few.

7710. Now, the cancerous growth would incapacitate the men?—Yes.

7711. Would the warts incapacitate the men from work?—Not in themselves, but if situated in a position that would be specially liable to friction, they would become inflamed.

7712. What parts?—In the groin or between the legs.

7713. Have you seen the men in that condition?—Yes. In one case in the groin an operation for removal was done.

7714. That is cancerous growth?—No, only warts.

7715. How many men at present are on the funds of the Shepherds' Lodge from pitch disease?—Not one.

7716. How long ago was one?—I should say about 12 months.

7717. And what was the matter with him?—Inflammation of the eye.

7718. That occasionally incapacitates them from work?—Yes. I removed a wart from the eyebrow of the man.

7719. But he was not incapacitated?—He was while this was healing.

7720. Do you know anything about the pay these men receive or their mode of life?—No.

7721. They are not, I suppose, anxious to be incapacitated if they can help it?—Oh, no; I should say not.

7722. (Dr. Legge.) Have you kept any of these growths you have removed?—No.

7723. Do you know whether any description has ever been published of the microscopical characteristics they present?—No.

7724. You say they have the character of ordinary warts?—Yes.

7725. Do you notice that these men's faces are scarred?—Yes.

7726. How do these scars occur?—From applications they put on the warts, I believe.

7727. Are you quite certain?—Yes; I know of cases where scars have been left by these applications.

7728. Have you ever seen these warts break down and form a scab, and then the scab fall off and leave an ulcerated base, which would heal up and leave a scar like that?—One can understand it might be so. I have not seen it.

7729. You are not quite certain those scars are not the result of the natural process of healing which has occurred without the application of any ointment?—I have seen cases where they have become inflamed, and one can understand ulcers might occur in such circumstances.

7730. But in your experience it is not the usual course for the wart to break down in that way?—I should say not.

7731. Have you seen any cystic condition produced?—No.

7732. Have you heard of it?—No.

7733. Do those men's skins become pigmented?—As a rule they have very dark skins. I am quite unable to say it was a condition of true pigmentation.

7734. You do not know how far it might be removed by soap and water?—No; they have very dark skins.

7735. Have you seen a general eruption on the arms and bodies, and eczema?—No.

7736. Have they come to you complaining of irritation of the skin?—No, except perhaps on the base of a wart which may have become inflamed.

7737. With regard to the condition of the eyes, does that affect the interior structure at all?—No; I do not think so.

7738. What would that be?—Conjunctivitis.

7739. Does that lead to defective vision?—I have not seen any case I can trace to such a cause.

7740. Is this form of cancer distinct from cancer common to the general population?—No, I do not think so.

7741. But is epithelioma of the scrotum common to the general population?—No; it is common to people who might be subject to irritation in these parts. Sweeps are subject to it.

7742. Have you seen cases in sweeps?—I have seen one case.

7743. And does it resemble the condition found in pitch workers?—Yes.

7744. You consider this is a trade disease?—Yes, I should say it is a trade disease.

7745. Do you think it can be prevented by cleanliness?—Yes; it is well recognised among the workmen that if the parts are protected they do not get these warts.

7746. The scrotum is protected?—In one case I believe it was said at the time the man had a hole in his trousers, through which the dust penetrated.

7747. (Chairman.) Did you see that hole yourself?—No.

7748. What made you think so?—I was told at the time.

7749. By whom?—Some of the workmen.

7750. (Dr. Legge.) Have you seen warts about the chest?—Yes, and the back of the neck.

7751. Have you come across it among tar workers as well? Do you attend any of the workmen at the tar works?—No, I have no experience of the tar workers.

7752. You have been over the fuel works; you know all the processes?—No; I do not know all the processes.

7753. But you said, I think, they do not occur where there is no dust?—I have no experience of its occurring in other men but those who are pitch workers. And I have made inquiries of some of the men.

7754-6. Do you remember the names of the two men you mention in your *précis*?—No; it is some time ago.

7757. Do you know what their ages were?—One was a man about 48, and the other would be older.

7758. It does not occur in early life at all—this condition?—No.

7759. What is the extent of the largest warts?—I have seen warts about the forehead about three-quarters of an inch long.

7760. And when they get inflamed, are they painful, and do they lead to abstinence from work?—I know of one case of a man who had severe neuralgia due to the presence of one of these warts on his face. He had severe pains in the forehead—at any rate, they seemed to have been caused by these warts.

7761. (*Chairman.*) We are informed—do you agree—that the dust does not give the men phthisis or anything of that sort?—No, I have not come across any cases.

Mr. E. B. EVANS, L.R.C.P., M.R.C.S., called and examined.

7765. (*Chairman.*) What is your position, Dr. Evans, here?—I am surgeon to the Atlantic Fuel and the Pacific Fuel Works.

7766. And also to the Graigola?—No; I have nothing to do with that.

7767. You are employed by the owners?—No, by the men. The owners deduct the contributions every week from the wages, and then send it on to me.

7768. The men choose their doctor?—Oh, yes.

7769. Do they belong to a benefit society of some sort?—No; it is simply medical attendance.

7770. Solely medical attendance to the men at these works?—That is so.

7771. Now will you tell us in your own way, please, what you know about the injuries through working in pitch?—I have been surgeon there for a great many years—ever since the works started really. I have not had a large number of cases—eight or ten altogether in over twenty years.

7772. So it is not a very common complaint?—Oh dear me, no.

7773. It is a small thing in its way?—A small number of the men are affected.

7774. The symptoms, I believe, we may take it, are warts, affection of the eyes, and ultimately in some cases cancer?—I have never seen a case gone to cancer—any case I have had. Whether I have had it in the early stage I do not know. They generally come to the works' doctor first, and then if serious go to the hospital. The worst I have had have been in the first case warts, on the scrotum generally, about the size of a walnut. They have been removed at once, and generally there has been no recurrence.

7775. How many men are there, roughly, in these two works?—I have no idea. I ought not to say a small number are affected, but a small number come to me. I think you asked me if a small number were affected. I should have said a small number come to me.

7776. There are more affected than come to you?—They go to the hospital.

7777. How many men are there in the two works altogether?—I should think about 150 altogether. They do not all pay the doctor. It is a voluntary matter. I should think about 200 at the outside. I am not speaking with certain knowledge.

7778. Of those you have only met a few cases?—About 10 cases in 20 years, and those all from the Atlantic Works. I have not seen any from the Pacific Works.

7779. What are the names Pacific and Atlantic derived from? From the places they trade to?—No, I think only a distinguishing name.

7780. Can you give me any reason why cases come from one works and not from the other?—I cannot.

7781. Do the men come slightly affected?—No.

7782. Then it does not affect them when slight?—Not unless they have it in the scrotum, and then they come.

7783. They do not come with lesser complaints?—As long as it does not inconvenience them. If it does they come.

7784. I suppose it is a disease connected in some degree with want of cleanliness in person?—Yes; if the men were careful they would stand less risk. I think it would be something of the same nature, but not so malignant, as chimney sweeps' cancer.

7785. Have you had any experience in the latter?—I have seen one or two cases, but that is a much more malignant growth.

7786. And yet the same sort of thing?—Yes; but chimney sweeps' cancer is much more malignant.

7762. It is asserted also that apart from these warts and other troubles the dust itself seems rather antiseptic and healthy in character?—It might be so.

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7763. Would you agree with that? Apart from that, 27 Feb. 1907. the men do not seem unhealthy?—No.

7764. All you can say is, apart from the warts, the industry cannot be called unhealthy?—No.

7787. And apparently in some way connected with pitchy vapour or dust, and arising from tar in both cases?—But pitch is much more irritating; it contains carbolic acid and other things.

7788. But soot contains, after all, the same substance?—Yes, but all the volatile matters have disappeared.

7789. Unless retained in the chimney. Would not you imagine in the soot you would get much the same composition. Both come from coal, both from the effect of heat on coal, both in a sense the produce of distillation?—Yes, but I should imagine the dust from pitch worse than smoke from ordinary coal.

7790. And yet the effects from soot are more serious?—Yes.

7791. How many a year would you have?—Two to three a year—not so many as that.

7792. How many come to you altogether for that complaint?—Very few. As a rule, they are really healthy men. It is more the wives and families that a club doctor attends.

7793. We are told that the pitch smell and all that, apart from this wart disease, is rather healthy than otherwise?—Supposed to be; it contains carbolic, an antiseptic. As a rule, they are healthy men, although their appearance is deceptive. There is a sort of pigmentation of the skin.

7794. Could they wash that off?—I am afraid not.

7795. Would a series of Turkish baths wash it out?—I don't think they run to that. I think it would be better if the men washed themselves as colliers do. Colliers are notoriously clean. They have hot baths every time they go home. Fuel workers don't, and I think pitch dust and deposit cause injury. I have talked to a man who said: "I never get any trouble, because I wash myself."

7796. How are we to get them to wash themselves?—That is the question. The same thing applies to spelter men and lead-workers. They would rather run the risk.

7797. Would you go so far as to say there is a specific disease?—There is no doubt about that, and pitch has a most irritating effect. I had a case where a minute particle got into a man's eye, and the whole thing became disorganised and he had to have the eye removed.

7798. Through a particle of pitch getting into the eye?—Yes, within 48 hours.

7799. Did some get in the eye with that result?—This was a piece of hot pitch.

7800. But if a man got it in the eye, would you suggest he should have the eye removed?—This is an exception.

7801. You regard that as quite exceptional?—Yes.

7802. (*Dr. Legge.*) I was going to ask about the condition of the eyes. Have you had cases to treat?—Occasionally inflammation of the eye.

7803. Conjunctivitis?—Yes.

7804. Have you had many?—Cases, as a rule, go to the hospital.

7805. Do men come to you obviously blind?—No.

7806. In one eye?—I have not seen any, but it does affect the eye undoubtedly.

7807. It has been suggested that the skin generally becomes very sensitive and liable to inflammation?—Yes, of course, if they perspire the effect is more intense.

7808. Is it worse one season of the year than

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another?—I have not noticed it. There is no recurrence of the growths once removed.

7809. Have you removed warts?—Several.

7810-11. Have you sent any away to be examined?—No.

7812. Do you know whether any examination has been made?—Not to my knowledge.

7813. Do you know whether they are the same in character as ordinary warts?—Just ordinary warts, not as a rule malignant really.

7814. On some of the men you have seen scars?—Yes.

7815. Is that the result of treatment or the natural course of the skin in getting rid of the warts?—It is the result of treatment, I think. As a rule, they are just burnt off. Sometimes they are so large it is absurd to burn them, and we always excise them right away. Ordinarily, they are burnt away, and then it breaks off and leaves a scar and marks in that particular spot.

7816. It has been mentioned by Mr. Brook that they differ from ordinary warts in that they break down and a crust is formed, and that the crust falls off after leaving an ulcerated base?—That is so. I thought you meant in appearance. The pitch wart is more moist.

7817. What I want to find out is whether these scars are the result of the breaking down of these warts, or whether they are due to the caustic applied?—It is the result of the wart dropping off and leaving a slight white mark.

7818. So the course of development is different from the ordinary wart one finds on children's hands?—Yes; the ordinary wart has not such a big base.

7819. Have you seen any of these warts in an inflamed condition?—No.

7820. Do you attend workers in the tar works—the tar distilleries?—I did for some time at Port Tennant.

7821. Do you find the same condition there?—No, except a pigmented skin—slight pigmentation.

7822-3-4. Have you ever seen any cysts in the scrotum?—No; never cysts.

7825. Leaving the question of these pitch warts, you attend the workmen at the arsenic reduction works?—I do.

7826. Do you attend the men who unload the ore?—I attend all the men. I mean the works at Port Tennant.

7827. Have you had any experience of men discharging mundic ore?—No.

7828. You know of no men who have been incapacitated through warts?—Except while under treatment.

7829. So it would not be a serious matter if this disease were included under the Workmen's Compensation Act?—If taken early the remedy is very simple, and it does not seem to affect the general health at all. Of course, during treatment, the men are bound to lie up. I have not seen any occurrence where the whole scrotum has been eaten away. Mine have been quite isolated warts.

7830. (Chairman.) Do you know anything about bronchitis being due to the unloading of cargoes of grain and ore?—No.

7831. Have any of the men under your care at all or whom you have seen been connected with the loading or unloading of cargoes other than pitch?—I have never asked the question.

7832. In fact, do you know anything about diseases got through unloading cargoes?—No.

7833. Calamine?—No; not more than the spelter works men whom I look after. I make no distinction, except the furnacemen who come to me.

7834. Do you come across phthisis and bronchial complaints?—No.

7835. Have you any reason to believe that there are bronchial complaints or phthisis caused by dust in unloading cargoes?—I have never heard of it.

Mr. J. S. H. ROBERTS, L.R.C.P., M.R.C.S., called and examined.

Mr. J. S. H.
Roberts,
L.R.C.P.,
M.R.C.S.

7836. (Chairman.) What is your position here? Have you private practice?—Yes, private practice and contract practice, both.

7837. That is to say, with some employers and men?—Men, and I am physician to the hospital.

7838. What works are you connected with?—The Graigola.

7839. I think I won't take you at length through this. You agree probably with this that we have had from previous witnesses—that, as the result of working with pitch there are three things—weakness of the eyes, warts, which if not removed, may develop into cancerous growth?—Yes.

7840. And I think we know the symptoms pretty well now. What I should like to ask you about is the proportion of men who get it. You have a contract to attend all the men at the Graigola works?—Not all.

7841. How many come to you?—Between 200 and 250.

7842. That is out of the 300 men employed there?—I don't know how many are employed.

7843. There are, I understand, about 300. How long have you had the contract?—Since about August, 1891.

7844. During that period out of the 250 men how many men have been affected either slightly or gravely with the disease?—I cannot say that. I have no means of telling. I did not know this inquiry was going to be held, so I have not got notes.

7845. Can you give us any idea how many would have come to you in the course of last year?—No, I cannot. I only know that I have seen about two since I heard this inquiry was going on.

7846. But, of course, that does not help us much?—I am afraid I cannot. I have kept no notes.

7847. Cannot you give us an idea?—I should say there were not many.

7848. Two or three a year?—I should think perhaps

more than that. The men don't come with the warts. They treat them themselves as a rule.

7849. If under contract with you they would come to you?—They don't for these warts unless they get very bad. I don't believe I see more than two bad cases in a year. Some of them drop off of their own accord, and then they have their own special means of getting rid of them.

7850. And what are the special means?—Oh! one will use soda and spittle—common soda; another caustic or nitrate of silver, another aromatic vinegar put on with a match head.

7851. That is an extraordinary treatment?—They do that, and find it effective.

7852. Is there anything in the match?—Not the match—the match end.

7853. Do you know anything about the graver cases?—I have seen one case that became malignant.

7854. What were the symptoms of the case?—It was the scrotum, and just when I went on about fifteen years ago. It happened (I forget the date of his death) about 1894 to a man called —.

7855. A long time ago?—Yes, so I don't remember much about it. I know he had a malignant disease on the scrotum.

7856. And he was taken to the hospital?—No; he died at home.

7857. Did you remove the cause?—No; it had gone too far before I saw him.

7858. If this disease were put in the schedule of the Workmen's Compensation Act there are not a great many men who would claim under it?—There are not many men who are unable to work because of it. A lot suffer from it.

7859. Nor does it seem to me likely that any of the older men would be discharged from fear of their employers falling under the liability?—I should think not, because the numbers are so small. The warts develop rapidly with some men. I was talking to a

man to-day who had been there over twenty years and had never had a wart. Only a few get them.

7859* And generally those who are not clean?—Yes; that is it.

7860. It is to a large extent their own fault?—Yes.

7861. That is not a disqualification under the Act, but still their own fault?—Yes. Since this inquiry came on I asked several of them why some have them and some have not, and they said, "because they don't wash."

7862. It is a pity you cannot teach them to bathe?—It would be useful at the fuel works.

7863. I suppose in cases of that sort the best practical place for the men to have a wash is at their homes. They might wash at the works, but then the men would have to put on the same clothes?—Yes, if the men had baths at the works; but rather than that not at all. They live largely in old houses. The modern houses have baths.

7864. What is the rent of the modern workmen's house?—I believe about 8s. a week.

7865. Some of the men are getting very high wages?—Yes.

7866. I am told in some cases the wages go as high as 16s. in a day?—Yes, in one portion of the work.

7867. That is the loading?—Yes, occasionally. That is not regular, of course.

7868. They can afford 8s. house rent with that?—The

shippers can, but it is more the men working in the pitch.

7869. They are not getting more than 4s. or 5s. a day?—I should think more than that; but they are the ones who suffer mostly.

7870. (Dr. Legge.) Do you think there is any special process where the disease is more frequent than elsewhere?—I don't know.

7871. (Chairman.) I think you mention in your *précis* the pitch breakers?—Yes. The men in the pitch, who are unloading the pitch and who are grinding the pitch, are the ones who suffer.

7872. (Dr. Legge.) Have you removed any of these warts?—No; I have sent them to the hospital.

7873. Do you have to treat cases in which the skin is in an eczematous condition by reason of the work?—No; I do not think so.

7874. Is the skin very sensitive in sunlight?—Yes.

7875. Can you see it inflamed?—Yes.

7876. And the eyes?—Yes.

7877. Have you known serious effects in the eye? Loss of sight?—No.

7878. Have you any experience of bronchitis from unloading cargoes of grain or calamine?—No.

7879. Copper ore?—No.

7880. Grain?—No.

Mr. S. J. RODERICK, M.B., C.M., called and examined.

7881. (Chairman.) What is your position? Have you private practice?—Yes.

7882. Are you surgeon of any hospital or works?—Yes, of two works—tinworks. I may say three works.

7883. That is to say, you are selected by the men?—Yes.

7883*. How many men are there in the three tinworks?—I could not say. I daresay between men, boys, and girls, about 500 in one, 300 in the other, and perhaps 700 in the other—the Old Castle.

7884. Do they all contract with you or not?—Yes.

7885. So you have the care of about 2,000 people?—The large works is divided up amongst other medical men, but the other works I have.

7886. At any rate you have 1,000?—I dare say.

7887. Can you tell us about the tinsplate workers? Is there any disease among them—any disease that is in any way specific to the industry?—I don't think so. I don't know of any except in the tinning department where they are subject to bronchial affections, asthma, or something of that kind, but whether brought on by the work I cannot say. They would be made worse by being employed in the stife.

7888. What would do that?—The dust largely and the stife from the tin pots.

7889. Is that chloride of zinc?—Yes.

7890. Have you any proof it is the dust and fumes from the chloride of zinc that makes them ill?—No.

7891. Is there a great proportion of phthisis, bronchitis, and asthma, or are the men fairly healthy?—Fairly healthy. There are some who say that people suffering from asthma are better for being in the tinning house.

7891*. So, in your view, the circumstances are not such as to cause the tinworks to be put down as the cause of disease?—No; I cannot say there is any disease due to working in tinworks.

7892. And the average health is as good as in other occupations?—Yes; I have spoken to other medical men, and they are of the same opinion, excepting in regard to the tinning department.

7893. Then you hold a different opinion with regard to the tinning department?—Yes.

7894. You think there is something there injurious to health?—Yes; if they could do away with the dust they would get rid of the disease. If a man came to me I could not say, "Yes, your disease is such, and was caused by working in tinworks."

7895. (Dr. Legge.) How would you describe one of these bronchial attacks?—Typical attacks of asthma.

7896. Spasmodic asthma?—Yes.

7897. Then it would not be bronchitis. What do you find on listening to the chest?—Just the ordinary wheezing.

7898. In the large tubes?—Yes.

7899. Not in the fine tubes?—It passes off just like ordinary asthma. On the Monday morning they feel pretty well after the Saturday afternoon and Sunday off.

7900. Is it worse on Saturday afternoons than on Sundays?—It gets better after absence from the works.

7901. Is not that strong evidence that it is produced by the works?—It is made worse by it. I would not say caused by it.

7902. Do you get these asthmatic attacks among people not employed at the works in Llanelly?—Yes.

7903. Have you tried to find out whether those people are working in dusty processes?—No; but there are a great many who do not suffer who work in these departments; so there may be a predisposition.

7904. Does this condition go on from bad to worse? Supposing a man is 20 years in the works, does he get worse and chronically incapacitated?—A great many leave because they have work elsewhere away from the dust. They leave as comparatively young men from 35 to 40.

7905. Can you recall an actual instance where that has happened?—Yes.

7906. Can you describe what you find on examining their chests?—Well, they are fairly healthy after being away all this time.

7907. Do they suffer from chronic bronchitis?—No; they are commission agents largely, and always out of doors, and don't seem to suffer at all now.

7908. That would tend to show it did produce spasmodic asthma?—Yes, in some, but there may be predisposition.

7909. Have you inquired whether some of these have been asthmatic before they went into the works?—No; they gradually pass from one department to another. They start as cold roll boys and pass into the tinning department.

7910. Do the attacks yield to the ordinary treatment of bronchitis?—When they are away from the works they get better.

7911. Do they get laid up for a week or a fortnight or a month at a time?—Some go on working as they are. I cannot say that there are many who are really kept away from the works for any lengthened period.

7912. Have you had any opportunity of examining the lung of a tinman *post-mortem*?—No.

Mr. J. S. H.
Roberts,
L.R.C.P.,
M.R.C.S.

27 Feb. 1907.

Mr. S. J.
Roderick,
M.B., C.M.

Mr. S. J.
Roderick,
M.B., C.M.

27 Feb. 1907.

7913. That condition has never been described?—No.

7914. Have you ever seen any skin affections amongst these men?—No, only as the result of flux getting on the hands—simply from the hydrochloric acid.

7915. Do the fumes produce actual running of the nose—catarrh?—No; I have not noticed it.

7916. It has been said eczema is produced by it.

Have you seen it?—No; they might get it from the dusting process.

7917. Is there any condition which you can describe as mechanical bronchitis?—I believe it would be almost mechanical.

7918. But the mechanical bronchitis would occur in the fine tubes, and you say that is not the case?—It would be in the fine as well as the large. It would not be capillary bronchitis. It is not as bad as that.

Mr. JOHN ARNALLT JONES, M.D., called and examined.

Mr. J. A.
Jones, M.D.

7919. (*Chairman.*) What is your position here? Are you doctor of any hospital or is yours exclusively a private practice?—I am surgeon to works and have public appointments.

7920. To what works are you surgeon?—Surgeon to tinplate works.

7921. How many?—Two.

7922. And how many men?—I should say surgeon to about 500 tinplate workers, roughly.

7923. What other men are you surgeon to?—Some colliers.

7924. Any people who are cargo unloaders?—Yes, that sort of men.

7925. How many cargo unloaders?—About 100.

7926. What is the nature of the cargoes they are unloading?—At Port Talbot the cargoes discharged are ballast, pit wood, pig and scrap iron, and iron ores, copper precipitate, and pitch.

7927. I am not going to ask you much about pitch. We have had so much evidence about it. But I should like to know whether as a consequence of unloading cargoes any phthisis, or bronchitis, or respiratory organ diseases are produced?—No; we have not got a large phthisis death rate at Port Talbot.

7928. That may be so, but perhaps that hardly answers my question. You may have a low death rate, but what I want to know is are the men who are unloading cargoes sufferers from it?—No; the men who unload cargoes are generally the pick of the population—very fine fellows, as a rule.

7929. What is in your judgment the effect of discharging these cargoes on health?—It irritates the respiratory organs.

7930-1-2. Does it irritate them sufficiently to cause them to abandon work altogether?—If a man suffers from a disease of a bronchitic nature or from a chronic cold, he would have to give up discharging copper cargoes. There are men who have been employed at this sort of work for years and don't seem to suffer. But it is difficult to believe it is to their advantage to go on with the work. They enjoy immunity.

7933. Your view is that if a man from other causes is disposed to respiratory disease he ought not to take to that employment?—No.

7934. It largely aggravates respiratory disease if he has it, but it won't originate it?—What the men tell me is, when they start on the work they are generally upset, and suffer from the chest, but after unloading a cargo or two they get immune.

7935. And they go on all their lives?—Fifteen or 20 years.

7936. Does it shorten their lives?—I have not known a case.

7937. It does not appear to me that your view makes out that this ought to be put into the schedule for compensation for diseases of occupation. We should feel hardly justified in doing that on this evidence?—You may bear in mind the men are protected by muzzles. It would be very bad for them if not.

7938. They wear muzzles, and they ought to be compelled to do so?—Yes.

7939. Assuming that they wear them, do you say the men are subject to a disease of occupation?—No.

7940. Have you seen grain cargoes discharged at all?—No; they don't discharge grain at Port Talbot.

7941. What is the character of the muzzle employed?—It covers their faces, and the air is filtered through cotton wool.

7942. Is it very large?—It covers their face, and if they have not got a muzzle they will wet a handkerchief.

7943. (*Dr. Legge.*) Amongst tinplate workers do you find any serious illness; is there anything specific?—No; the tinplate worker is not the type of man the collier is. He is not so robust. He is a pasty individual very often, and the tinplate worker is a spirit drinker, while the collier is a beer drinker. That is my experience. Tinplate workers work over fumes of hydrochloric acid, and that irritates the chest.

7944. What do they come to you for?—I think they are more liable to have catarrh.

7945. Nasal?—Nasal and chest.

7946. When you listen to their chests what do you find?—I have not noticed anything particularly definite.

7947. Anything you can distinguish from ordinary bronchial catarrh?—No. I have had a good deal more cases of nasal catarrh. I do a good deal of ear and nose work. I find I get more complaints of the nose and ear from tinplate workers than from others.

7948. Which section do you mean?—Mostly those working over the fumes.

7949. You think the fumes are worse than the dust?—I don't like to give an opinion.

7950. You have been inside these works?—Often.

7951. And you know there is much dust?—A great deal.

7952. You would not like to give an opinion which it is?—No.

7953. Do you find these nose and ear symptoms in the girls as well as the men?—Yes.

7954. What is the condition of the throat?—Generally dry.

7955. Would it be that inflammatory condition of the throat which affects the eustachian tube?—I think that is the case.

7956. Can you say that is specific?—I should not like to say that.

7957. What do you attribute this to?—It may be dust. All these tinworks are very exposed. There is a great deal of draught.

7958. To return to the chest symptoms, does the ailment resemble asthma?—I must say in my district true asthma is very rare.

7959. Even in tinplate works?—Yes; I don't think I can recall a case of asthma. Cases are very few indeed which one cannot connect with heart. Spasmodic asthma is not common. I only know of one case of spasmodic asthma in a tinworkman, and he was a man who came into the district with it.

7960. Do you know workmen who have had to give up employment altogether because they could not stand the work?—I cannot recall a case at the moment.

7961. How many years have you been in attendance at the works?—I have been qualified since 1884, and practising ever since.

7962. Comparing tinplate workers with those men who unload cargoes, which are the healthier lot?—I should say the cargo men. They are a fine lot of fellows, you know.

7963. The work necessitates them being singularly powerful to stand the strain?—It weeds them out.

7964. And do you think these men go into tinplate works?—There are plenty of weedy men in tinplate works.

7965. Are there any other symptoms in the men who

unload cargo in the first part of the respiratory tract—I mean in the nose?—No; they very seldom come and complain. All I have got is from inquiry.

7966. It has been alleged that bleeding of the nose is common?—I have not seen it.

7967. In your nasal work, do you come across perforation of the septum through dust?—No.

7968. I think you said, in answer to Mr. Cunyng-hame, it does not shorten their lives?—No.

7969. What do they die of?—They do not die. I have not seen any die yet. There are men working 20 years, and good for more work.

7970. I forget the number of men you said you see?—About 100 at the docks discharging cargoes.

7971. Not much more than 100?—Not who would come under my care.

7972. Are there any other doctors in Port Talbot who would see them?—I should think I have seen as many as any.

7973. Have you been in the holds of the vessels?—Yes.

7974. Is there much dust?—Oh, yes; I would not like to work in it.

7975. Have you had experience in calamine ore?—No.

7976. That is not unloaded there?—No, pig and scrap iron.

7977. Do you know the term spathic ore?—No, I do not.

7978. (Chairman.) I suppose you would agree, with regard to the pitch, that of the men who are engaged in unloading the pitch, some of them suffer from warts,

and that these occasionally develop into a cancerous growth?—I have made inquiries. I have only had one case of a man with a few warts scattered about his face, and I should believe that pitch would give rise to epitheloma, in the same way as chimney sweeps' is produced in the scrotum.

7979. Do not some of the men engaged in the grinding get warts?—No; this man only came with a few small warts scattered about the face, and he is now under treatment, having them burnt.

7980. Beyond that you have never seen anything?—No.

7981. (Dr. Legge.) Is not pneumonia common?—Yes, fairly common, but I do not think out of proportion. I ought to have brought my annual report as medical officer of health here. Perhaps that might have given you some information.

7982. You describe in your *précis* attacks on the gastric system in connection with the unloading of cargoes of grain?—Not grain—precipitate.

7983. Do you think that is due to the metal, or simply to mechanical irritation of the dust?—It gives a very nasty taste at the back of the mouth, and that makes the men sick. When I was a medical student I used to pass works where they smelted copper, and if I went round before lunch I could not eat because of the nasty metallic taste. It produced sickness, and I can therefore understand these men suffering from the same as I experienced.

7984. Does the dust affect the eyes at all?—These men do not complain. Of course, there must be a mechanical irritation.

7985. You think the pitch workers are in a worse plight than the others?—I should think so.

Mr. G. EVANS JONES, L.R.C.P., L.R.C.S., called and examined.

7986. (Chairman.) What position do you occupy, Dr. Jones? Have you private practice?—Private and works practice.

7987. How many men are there in the works? How many works do you attend?—Between Dr. Jones, Llan-samlet, and myself we attend three tinsplate works.

7988. And how many men are there in these works, about 1,000?—Really I could not tell you.

7989. (Dr. Legge.) Which are they?—The Midland and Morriston Works and the Aber Tinsplate Works.

7990. (Chairman.) Your experience began in 1898, I believe?—Yes.

7991. What did you find that the men suffered from then?—The first thing that drew my attention to it was that I used to have cases that were apparently bronchitis, and after treating them with the ordinary treatment for bronchial affections arising from colds and so on, I found it did not give way to the ordinary treatment, and then, on inquiry, I found they were working in this smoky atmosphere, which they said came from the flux, and they had to go off work for an hour or two at a time, and when they got relief went back again. Then I inquired what the flux was composed of, and they said mostly spelter. Having attended spelter works, and having some experience in lead colic, I formed the opinion lead had something to do with it.

7992. What are the symptoms you find from the lead?—Gastric disturbance, pain in the stomach, and constipation.

7993. Do you find the gums discoloured?—Not of the men working in the flux. In lead colic we do.

7994. What works are those?—Spelter works.

7995. What are the symptoms due to the tin? Lead poisoning we need not deal with. It is dealt with in the Act.—There may be dust from the tin oxide, the tin and lead, and then the fumes from the flux used—powdered gypsum or bran.

7996. (Dr. Legge.) Gypsum used instead of bran?—Yes.

7997. (Chairman.) Some of the workmen are incapacitated from work?—Yes.

7998. What are the symptoms?—Purely tightness of the chest and cough.

7999. And colic pains?—No; mostly tightness and shortness of breath.

8000. That is a symptom that may occur in any occupation?—We find it more especially among tinsplate workers. You get it in colliers where dust arises from the coal.

8001. But you may get it where there is no dust?—Yes; but these men are specially liable to it.

8002. Have you any figures in support?—No; but I have 13 or 14 cases of men losing three, four, five, six, and nine months, and in one case a man lost three or four years.

8003. Are you doctor for other works than tin works?—Yes, tin works, spelter, and collieries.

8004. Do you find the men from the collieries have the same complaint?—Not exactly the same.

8005. Can you give us any reason for thinking there is any specific disease of occupation among the tin workers? I would not call it a specific disease. What impresses me so much is that a man works in the dust and smoke for some time, and every now and again he is leaving the work for an hour or two on account of shortness and difficulty in breathing. He gets relieved, and goes back again. Some men have been working for years, and have to leave it and take outdoor occupation, and they are not troubled at all after. I saw a man the other day. He worked in the tin house a number of years, and his chest always troubled him. He left the work, and I met him on the road selling greengrocery, and you could hear him a mile away, whereas he could hardly breathe before.

8006-7. Is this a disease that ought to be scheduled as a disease under which compensation should be paid?—I would not call it a disease, but these fumes and dust aggravate these troubles. If a man has a slight cold and works in the midst of dust it is much aggravated. I could not call it a specific disease in any event.

8008. Not quite a disease in the same sense, for instance, as lead poisoning would be?—No.

8009. Do you know anything about pitch?—Nothing at all.

8010. (Dr. Legge.) When one of these men gets laid up, and you are called in, what signs do you find in the lungs?—Simply the whole lung seems gorged with blood.

8011. Is there dulness?—No.

8012. What do you hear with the stethoscope?—Râles.

Mr. J. A. Jones, M.D.

27 Feb. 1907.

Mr. G. E. Jones, L.R.C.P., L.R.C.S.

Mr. G. E.
Jones,
L.R.C.P.,
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8013. In the larger tubes?—Yes; not in the capillaries, and mostly in the base of the lungs.

8014. Has it any similarity to spasmodic asthma?—Yes.

8015. Do they get better in a number of days?—Some do.

8016. After they have gone back to work and had several of these attacks, after 10 years what do you find then in their chests? Is there any difference?—There is a man I know here. It is the most difficult case I know of. There is no damage in the lungs.

8017. Does it develop into pneumonia?—No.

8018. Does it develop into bronchitis and emphysema?—Into chronic bronchitis it does.

8019. There must be men working there considerably over 50 who have this condition and yet are still able to go on working?—Yes.

8020. So they are not seriously incapacitated?—No, I should not call it so.

8021. You were going to describe it in your own words?—This man — is about the worst case I know of. Sometimes he comes to me and says he has had "a mouthful of smoke again." That is how he describes it. And that his breath is short. His lung is gorged with blood, no temperature, breathing is short, expectoration, and still no breakdown in the lung itself. Then he has a marked constipation. He has little ulceration in the hands.

8022. Is he a tinman?—Yes.

8023. You say there is no temperature? Is that typical?—The only man I saw with temperature is a man a week ago, and that was his first attack.

8024. In ordinary acute bronchitis from a chill would there be temperature?—Yes.

8025. So that is one distinguishing point between them?—Yes. Because, in ordinary acute bronchitis you would always get temperature.

8026. Do you see a dozen of these cases in a year?—Well, I could not say exactly, because I have not kept a special account.

8027. But still you would be able to say. Do you know of any men who have had to give it up altogether?—Yes.

8028. How many?—I should say about four.

8029. And was that after many years?—Yes.

8030. Were they able to find other work? They

were not incapacitated so as not to be able to work at anything?—Only that particular work.

8031. Do you know of any who have had to give it up within a year because the symptoms were so severe?—No.

8032. Has your attention been called at all to heart disease caused by the heavy nature of the work in the rolling mills?—No; I have had one case, but I did not attribute it to that at the time.

8033. What did you attribute it to?—He attributed it to the hard work, but I thought he had some rheumatic mischief.

8034. Was there a definite murmur at the heart?—Yes.

8035. Did the murmur disappear?—No.

8036. So you cannot help us in that?—No.

8037. Have you seen conditions of eczema produced?—Yes.

8038. Do you think produced by flux?—He attributed it to the flux. He says only since working in the flux he has had it.

8039. I gather from you that the fumes are worse than the dust. Have you been inside the works?—No; only to an accident.

8040. Do you see many women who work there at tinplate cleaning?—Yes.

8041. Do they complain of the same thing?—I only know of one case, compared with numbers of the men.

8042. Have you had your attention called to the conditions of the throat?—Only ordinary tonsillitis—nothing special. There is one case I would like to call your attention to. This is a man named —, forty-six years of age, a tinman. Troubled mostly with the ordinary symptoms, shortness of breath and digestive troubles. I lost sight of him for a time. He went away for a change. And then I was called to see him—he then developed symptoms of locomotor ataxia. I don't know whether it is possible to trace this to the flux.

8043. This is interesting rather as an illustration?—Yes; I know this man was a steady-going man. He was not a drinker or anything of that kind—a clean-living man. So you could not attribute it to syphilis, as we often do.

8044. Do you know the difference in the physique of the actual tinmen and the other people working there?—Not so robust.

In the evening Professor Allbutt, Dr. Legge, and Mr. W. F. Brook, F.R.C.S., examined six men who were working, or had worked, in the manufacture of briquettes, and were believed to have suffered from pitch blindness or warts and cancer. Loss of sight in one case sixteen years previously had evidently been due to an acute septic inflammation from injury in the first instance from pitch dust. This had necessitated at the time removal of one eye. The other eye was shrunken, and appeared to have been the seat of an acute suppurative keratitis. The very defective sight in a second case—a man aged 68—appeared to be due to cataract, and to be in no way connected with his

employment in pitch, which he had left ten years previously.

The ages of the four men suffering from warts were 54, 37, 59, and 43. Duration of employment was considerable—over 20 years in each case. Three were engaged in the most dusty process at the grinding mill, and the other in the shipping department. Numerous depressed scars of healed warts were noted on the face. Three had undergone operation for epithelioma of the scrotum, involving removal of a testicle also in two instances. In one of these men an epitheliomatous growth was present on the scrotum.

TWENTY-SIXTH DAY.

Thursday, 28th February 1907.

MEMBERS PRESENT:

Mr. HENRY CUNYNGHAME, C.B. (*in the Chair*).
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. FRANK THOMAS, M.B., Walter Road, Swansea, called, and examined.

8133. (*Chairman.*) What is your position, doctor?—
I am an ophthalmic surgeon.

8134. To what hospital?—To the Swansea General
and Eye Hospital.

8135. Are you employed in any way for the employers
or men?—In no way.

8136. You have private practice besides that?—Yes.

8137. You have seen men who have been working
in pitch?—Yes.

8138. Making briquettes?—Yes.

8139. I think I may take it, may not I, that there
are three effects of working in pitch—first, affections of
the eye, then there are warts, and then, in certain
cases, but rather rarely, cancer or something akin to
cancer may supervene?—Yes.

8140. That, roughly, represents the whole thing
in a few words?—Yes.

8141. You have come here to talk only of the eye?—
Yes.

8142. Are you of opinion that there is a specific
disease or injury of the eye in this trade that can be
clearly traced to the trade, and that it is not a mere
fortuitous thing that anyone may catch?—I do not
think there is any specific disease, but I think where
injury occurs to the eyes by pitch they almost in-
variably do very badly. I believe the whole trouble
arises in the first place from the injury.

8143. (*Professor Allbutt.*) What is the name you give
it?—Keratitis, which results in sloughing of the
cornea.

8144. Do I understand that this is caused in the
first place by a slight injury to the eye that may occur
anyhow, and then is aggravated by the pitch?—I
think it is caused by the particles of the pitch. I
believe the particles adhere to the cornea and destroy
the delicate epithelium, and then the entrance of
micro-organisms is possible. I do not know that
infection is not helped by a certain amount of destruc-
tion of the corneal tissue by the pitch.

8145. Is it a trade injury caused by working in the
pitch?—It is not different from what a stoker might
get if he were to get a cinder into the eye and got
infection on top of it.

8146. Do you think it is more frequent in the case
of pitch workers than other people?—I think more
frequent.

8147. Then it follows that it does partake of the
nature of a trade injury?—Yes, I have always looked
on it as being very largely associated with pitch
workers.

8148. Have you seen the same symptoms with other
people?—Not with the same constancy.

8149. What do you mean?—Frequency.

8150. Not with the same frequency?—Yes.

8151. How many men have you had under you from
this cause within this year?—I have been trying to
find out, but we keep our notes in alphabetical order,
and I am afraid I cannot answer. I should say cer-
tainly twenty in a year.

8152. How many people came to you with their eyes
wrong?—About 1,500 cases in a year at the hospital,
where these pitch injuries are seen.

8153. Of whom about 20 represent pitch injuries?—
Yes, and I believe only the more severe kind have come
to me. I think some may get well without, or are
treated by their own doctors.

8154. Supposing a particle of pitch—a visible par-
ticle—were to lodge within the eyelid, is it as readily
detached as any other piece of dust?—No, but I do
not see them very often when in that condition.

8155. What is your opinion?—I believe they adhere
very firmly. I have only one case where I did remove
it, but it cleared up straight away without any com-
plication.

8156. If you have not got the notes, perhaps you
could let us have them afterwards?—Yes, I can.

8157. From memory you can tell us how you removed
it?—With an instrument—with a spud.

8158. Did you find you could just spoon it out, or
was it attached?—Attached to the epithelium, and I
think some of the epithelium came away with it.

8159. So as to leave an opening for septic poison-
ing?—Yes.

8160. Then you tell us that there is nothing in the
fully developed condition which is characteristic of
a pitch injury? If you went into the out-patient room
and saw a man suffering from the fully developed con-
dition you would not thereby know what had happened
to him?—No.

8161. But you would think it likely from your know-
ledge of the locality?—Yes.

Mr.
F. Thomas,
M.B.

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Mr. F.
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8162. And if you went further and heard he was a pitch worker you would think it more probable still that it was a pitch injury?—Yes.

8163. Then if, pursuing these inquiries, you learn the whole story of the case from beginning to end, you would have something more than the mere passing phase of it to guide you?—Yes.

8164. And taking the present phase with the past phases, you would have very little difficulty, with the large majority of cases, in giving your opinion?—Yes.

8165. You think a referee such as yourself would not find it difficult in the large majority of cases to speak decisively?—No.

8166. Taking it from beginning to end, and having full information?—No.

8167. Then there is a very important statement in your *précis*—"As a rule, secondary glaucoma. . . ." That is, of course, a very important result of your experience?—Yes.

8168. So when you say "as a rule" you mean as a rule there is very great risk of permanent loss of sight?—Unless the glaucoma is removed.

8169. Unless iridectomy is performed?—I never touch the iris. It would destroy the eye, I feel sure. What one does is to make a section across the cornea and get the clot of pus and fibrin out. That nearly always relieves the tension. The tension is due to the clot or hypopyon.

8170. You do not avert glaucoma by that?—In this condition I think you nearly always do relieve the secondary glaucoma.

8171. You mean by that time it is a glaucoma?—Secondary glaucoma, meaning glaucoma brought about as the result of some known factor, such as the presence of a clot. In primary glaucoma it is due to something we do not definitely know of.

8172. You mean the permanent effect on the vision would be much the same?—As a rule they cannot see much when they have it seriously, whether glaucoma or no glaucoma.

8173. So it does not matter much whether secondary or not?—No; they have perception of light or the counting of fingers, or something of that sort.

8174. The risk to the eye sight is so great that whether nominally glaucoma or not does not matter?—I should say not.

8175. Then you say, as supporting your diagnosis, that you look on the skin and see whether you find the remnants of these warts?—Yes.

8176. (Dr. Legge.) Is it consistent with your experience that a man may get a piece of pitch into his eye one day and the inflammation may be so extensive that it may be necessary to remove the eye on the following day?—I have never heard of such a case. I cannot believe it possible that in twenty-four hours such a condition could arise.

8177. Do you think it is consistent with your experience that it is the chemical ingredients in the pitch—carbolic, and creosote, and so on—that cause the intense irritation?—I believe it is produced by chemical action, which destroys the tissue and gives an entrance to the bacteria.

8178. Then it must be a trade injury?—I suppose it must be.

8179. Can you give a name to the particular condition?—Well, it is known as serpiginous ulcer of the cornea, but really sloughing keratitis describes it best. You may get the whole of the cornea sloughing away.

8180. Would you describe the fully developed condition?—When fully developed you have a more or less large ulcer of the cornea, brilliant yellow in colour. It exudes pus. It may or may not have perforated the eye ball. If not you have a large mass of pus in the anterior chamber, great tenderness, increased tension, and almost total blindness. That is, a perception of light only.

8181. With regard to the iris?—The iris as a rule is bound down to the lens underneath. It is rarely acted on by atrophine, the pupil, however, as a rule not being occluded by lymph.

8182. Have you heard of this condition in other districts, such as Cardiff?—Yes, I have spoken to men at Cardiff, and they always look on it as a serious condition. I do not know whether they look on it as seriously as I do.

8183. Perhaps it is a bigger industry at Swansea?—I think so. I do not think they meet with it so often.

8184. (Professor Allbutt.) Just one summary question. For all we know, little particles of pitch may get into the eyes of workmen and wash out again, but they are apt to make this attachment?—Yes.

8185. Taking these cases only, I think you have said that as a rule there is a breach of surface?—I believe there must be.

8186. So that these terrible consequences to the eye are really septic poisoning?—Yes. I believe the first thing is irritation and destruction of the tissue, and then you get the septic process commencing.

8187. And then you get the secondary septic condition?—I believe if one could get them before the septic process commenced one could save the great destruction.

8188. That, you think, is not to be hoped for?—Yes, unless people realise that the very slightest injuries lead to loss of the eye, and come to us at once. I gave a man ointment to use once, and he said it was quite impossible to use it because he found the pitch dust adhered to and irritated his eyes; so I have never since given men ointment to use at work. It is impracticable for us to adopt the antiseptic process in the ordinary condition of life.

Mr. EBENEZER DAVIES, M.R.C.S., called and examined.

Mr. E.
Davies,
M.R.C.S.

8189-90. (Chairman.) Mr. Davies, I think you are a member of the Royal College of Surgeons?—Yes.

8191. What is your position here? Have you private practice only?—Well, I used to have private practice, but I have given up private practice for some years, and now practically give my whole time to the work of Medical Officer of Health.

8192. To the town of Swansea?—To the town of Swansea.

8193. I believe you can give us some general statistics as to occupational disease?—I am afraid I cannot as to occupational disease. My experience of occupational disease has been very slight and very remote. I think it is 25 or 30 years since I had anything to do with workpeople as patients—contract work, or anything of that kind.

8194. I mean statistics you would have as medical officer of health. Can you throw any light on the disease got by working with pitch?—No; I have only

heard of one case, and that very recently from the factory inspector here, which I found on reference registered simply as a case of cancer, and in the person of a labourer, without any description of his employment.

8195. May we take it pitch disease is on a small scale, perhaps too small to be reflected in the general statistics of the health of the town?—Yes, I think so. I was going to supplement it by saying there is a certain amount of vagueness about certificates of death, specially with regard to occupations. A man is put down as a labourer, but no reference is made to what kind of employment he is engaged in.

8196. And therefore it is very difficult to throw light on a disease of this kind or a disease on a small scale from statistics?—Yes.

8197. But you would not be disposed to deny that a specific disease comes from pitch, or do you know nothing about it?—No, I do not. I heard of it only recently, and in one case I found the occupation not mentioned in the certificate.

8198. Have you any views as to diseases of the respiratory organs, phthisis, bronchitis in general, in the district?—The death rate from phthisis above 5 years is 1.4 to 1.5 per 1,000 of the population.

8199. How does that compare with the death rate of England and Wales in general?—I think rather high—above the average.

8200. To what do you attribute that?—Our rate from phthisis has fallen to some extent. I think the influence of main drainage had something to do with it. Years ago Dr. Buchanan referred to the absence of deep drainage as one of the conditions causing a high phthisis death rate. That has been remedied here.

8201. Is the difference between the figure of men and women marked? A good many women are engaged in industry here?—Not very large. Of the total deaths from phthisis at ages 15 and upwards during 5 years, 1901–5 inclusive) the proportion was males 54.7, females 45.3. I have worked out the occupations census of males and females here. Engaged in occupation—males, 83.5 per cent. of persons of 10 years and upwards. That is from the returns of the Registrar-General. Females engaged in occupation, 24.2 per cent.

8202. Of the whole population?—Yes, above 10 years. Then I have given the workers in iron and steel and metals—coal, patent fuel, and metals—about one-fifth, or more than one-fifth of the total population above 10 years of age.

8203. Is there more phthisis or respiratory organ disease amongst the occupational people than amongst the population at large?—I am afraid I have not any facts I can give you. Of course a very large amount of phthisis occurs in the workhouse after the period of work.

8204. To what do you attribute this excess—natural excess or occupation?—I should say not occupation. I don't think occupational cases of phthisis prevail largely in this district.

8205. That is the impression you have formed?—Yes.

8206. There is no growing evil, in fact, from respiratory organs?—No. I don't know whether this would be of any use to you. We have had a case of anthrax in 1904, and that recovered, and that was due to treatment of Chinese skins. I hand in these figures. The amount of women occupation is not so very large in Swansea.

8207. I should think that a quarter is rather a big figure. You gave us 24 per cent. just now?—That would include domestic servants, of course. It works out in regard to other occupations very much less. Deducting domestic service, the occupational percentage is 13.7 per cent. There are some women employed in tinplate works.

8208. (*Dr. Legge.*) Are there tin works in your district?—Yes, many of them are.

8209. And in addition to those in your district there are a great number of tinplate workmen who go outside to Morriston?—Morriston is within the County Borough. So there are a good many tin workers in the borough.

8210. And do you get them returned as tinplate workers in the death certificates?—Yes, usually, except in the case of "labourers."

8211. Do you notice any special incidence from any cause?—Of late years?

8212. Among the tinplate workers?—No, I don't.

8213. As regards respiratory diseases, are they not in excess of the general population?—Well, I could not tell you that without working it out for a series of years, which I could do for you.

8214. What is the number of tinplate workers in Swansea?

8215. (*Chairman.*) 2,186 males and 329 females?—Yes; those were the numbers at the Census, 1901.

8216. (*Chairman.*) Can you do that rapidly for us at once—show whether the proportion of respiratory diseases is larger among the tinplate workers? It could almost be done in a moment?—I have not got the data here, but I could get it for you in a few days.

8217. (*Dr. Legge.*) Do you ever get asthma returned as a cause of death amongst tinplate workers?—Yes, but not to any special extent.

8218. We should like it worked out for tinplate workers as compared with the general population for the men from about 15 years of age—phthisis and respiratory diseases?—Not the females?

8219. No; the males above 15 years of age as compared with the general male population of the same age in Swansea?—Yes.

8220. And we should also like to know the way in which their death is described. Whether you get asthma, for instance?—I should have to give the description as I get it.

8221. If you have them returned as asthma we should like to know?—You don't want the females?

8222. No; we will only have the males?—During a period of five years?

8223. Yes. It would be very interesting to get out also the heart disease figures for exactly the same population?—And you want asthma specially?

8224. No; never mind about that?—As a sanitary officer I receive no notifications of disease, except zymotic diseases. I don't get any official returns, except under the Notification Act.

8225. (*Professor Allbutt.*) You mean apart from deaths?—Yes.

8226. (*Dr. Legge.*) You have got a figure for heart disease generally?—Yes.

8227. How does that compare with the average?—Well, that I cannot tell you offhand.

8228. It has not struck you as being particularly high?—About one tenth of the total deaths in 1905 were from heart disease.

8229. Will you furnish that over the 5 years?—Yes. Would you like to have the total deaths from heart disease during these 5 years as compared with the total deaths of the population, and then a further analysis in regard to tinworkers?

8230. Yes, the proportion of heart disease to tinworkers?—And then work out the proportion on the census of the population engaged in works?

8231. Yes.

Mr. E. Davies,
M.R.C.S.

28 Feb. 1907.

Mr. S. L. GREGOR, called and examined.

Mr. S. L. Gregor. 8232. (Chairman.) You are managing director of the Graigola Fuel Works?—Yes.

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8233. We should be very much obliged for your observations on the allegation made as to soreness of eyes, warts, and in some cases cancer, arising out of the employment of making briquettes?—Well, this inquiry has been sprung upon us. Until I had a telephone message last night from the manager of the works I had absolutely no idea anything of the sort was afoot. The men evidently have had that knowledge for some time, and have been preparing their facts.

8234. As a plaintiff prepares his case before going into court?—I think it is useless denying as regards the men who have the handling of the pitch that these things do occur. But that is confined to a very small section.

8235. But we have evidence also among a few men not engaged in handling the pitch—the loading. Perhaps you would call that handling. The loading of the briquettes and the pitch breaking. We have evidence that those men have got it?—I should draw a hard-and-fast line. If anything of the sort is done, it certainly should not include any men except those who have the handling of the pitch. You may include those who discharge the boats, those who load pitch up from stock after put down to stock, and those who have the handling and breaking of it, but I have never known or heard of a case of the sort amongst the fuel shippers or any man engaged in the factory.

8236. Out of the 800 men engaged in the industry in Swansea how many would you call within the total of the industries you have spoken of as liable? What proportion would it be? Give it us roughly?—Off-hand I think I am fairly safe in saying it would not exceed 7 or 8 per cent. of the total number employed.

8237. What do the remaining 90 per cent. do?—Those are engaged in the manufacture of briquettes.

8238. But I thought they were exposed to pitch?—No; when the pitch is once broken up and goes into the conveyer, and the whole thing is melted, then the process is more or less in the open air, and the men are not in contact with it like the men who have the breaking of it.

8239. Say you have 300 men employed altogether, how many would be employed in unloading the pitch? Take the dangerous occupation first?—We could give you these figures exactly. Our works manager would be able to give you them. If taking pitch directly into the works from a steamer, so many men would be in the hold loading it, and so many shovelling, and one man in the bin, and two men in the crushers. And that number would be doubled.

8240. That is open to one remark, that if the disease does not happen except to about 7 or 8 per cent., there is no great harm in scheduling it for the whole industry, because you would not have to pay if it did not occur?—I quite see your point.

8241. Do you think that would cause it to be unfair?—With my knowledge of the working classes, which has extended now for a very long time, I am satisfied that nearly every case of illness that would occur in the works would be said to be due to pitch, and thus we should have numerous claims for compensation that we should have to fight, and I am sure you will appreciate the difficulty we should have in proving these cases.

8242. But in this particular instance we have a disease it is impossible to simulate?—The pitch wart.

8243. Yes; a man cannot imitate a pitch wart?—No.

8244. And unless he deliberately tries to rub the pitch in it would be a very difficult thing to malingering. That is as regards the warts at all events. But then you may perhaps say with regard to the eyes it would be possible for persons who had bad eyes from other causes to claim that they were bad through pitch?—Yes; it would be interesting to hear medical opinion as to whether a man is incapacitated from work before these pitch warts appear. I have no idea myself as to whether that is so or not.

8245. As far as it has gone the evidence is that it is certainly not till some time after they appear that any incapacity occurs. On the contrary, they say men go to work with the warts, and except that they are in-

convenienced, they can easily be removed, and it is not till they are very bad that cancer supervenes. The only point you can question is as to the eyes; but then again there should not be the least difficulty in telling whether the injury is due to pitch or some other cause. We should be very glad to hear any doctor or surgeon you may wish to bring forward who holds views on the point. Of course, it is very desirable to hear both sides?—Have you had medical evidence?

8246. Yes, but mostly from the men's point of view, I think. It all tends to show that there is a specific disease on a small scale?—I am afraid we cannot combat that.

8247. Then you may be in for something?—But why include the rest of the works?

8248. Because at present no one has shown us conclusively that it really is confined to only one branch.

(Professor Allbutt.) And might we go further and say the disease does not arise except in pitch workers?

8249. (Dr. Legge.) And then again there is the question of promotion. These men can get out of the dangerous into the non-dangerous?—Practically once a pitchman always a pitchman. It is one of the best paid occupations we have.

8250. (Chairman.) On the other hand, I understand that the shipping is held to be one of the occupations not dangerous?—Yes.

8251. Is not it a fact that the shippers are precisely the men who are recruited from all the other employments, and that a man after a certain time of service in the pitch claims, and has a right, to be taken on in the shipping gangs?—No; the pitchmen never go into the shipping gang. The shippers are never recruited from their ranks.

8252. But when there is a vacancy in the shipping gangs it is filled up as a right from the men who are already engaged in the works in the pitch?—Not as far as our works are concerned. In the "Atlantic" works the same men ship the fuel and discharge the pitch. Both operations are done by the regular shipping gang, as the shipping is not sufficient to give them full employment.

8253. And what do hobblers do?—Regular hobblers never deal with pitch, but casual hobblers sometimes do.

8254. But they are also recruited from the pitchmen?—No; I don't think so. Hobbling is a precarious employment.

8255. The shippers get as much as 16s. a day?—Some get £4 and £4 10s. a week in very busy times.

8256. Then there is a great competition to get into the shippers' business?—Yes; they have their friends.

8257. Don't pitchmen claim their share of promotion as much as the hobblers, and get it?—No; I have never known a case of a pitchman going shipping.

8258. Unless you show that these men absolutely keep to one branch only, one of the reasons for separating them as you suggest would vanish?—Yes.

8259. Perhaps you could draw up your views in a statement you could make after comparing your ideas with the managers of other works and send them to the secretary?—That would be the better way. We have had absolutely no opportunity of going into the matter.

8260. If you would like to draw up a report, please do so, and then if you would like to supplement it with evidence I daresay one of you could come to London.

8261. (Professor Allbutt.) It is unmistakably pitch disease?—Yes.

8262. (Dr. Legge.) The form the cancer assumes is the least malignant form of cancer?—Yes.

8263. And if removed it may not recur at all?—We have seen men who have had this removed 10 or 12 years ago, and there has been no sign of recurrence.

8264. (Chairman.) Providing it is sufficiently removed. It is your interest when you take a man on again to see the operation has been complete?—Then if he refuses to be operated on?

8265. The answer is he will get his compensation,

but he will be never employed again, because you have the right to inquire whether a man has had disease before. It is very easy for you to ear-mark a man. If it is proved that a man wilfully and knowingly represents himself in writing as not having previously suffered from disease compensation would not be payable? Take a case where a man has a pitch wart, and the time arrives when that wart ought to be operated upon, and the man refuses to be operated upon, and continues at his work.

8266. Would you discharge him if he refuses to be operated on?—We can't do that now.

8267. You will only be liable for such payment as is caused by the wart. In a pitch wart there is no incapacity, and consequently he will put himself in a difficult position?—Unless he has cancer.

8268. You can say "If you don't be operated on in the usual way we shall discharge you"?—We have had numbers of cases where a medical man has informed us that the person to whom we are paying compensation with a simple operation would be right, but the man refuses to be operated on.

8269. I think you have several remedies?—We have now been insured in most of the leading insurance companies, and they are absolutely helpless when a man refuses to be operated on.

8270. Now you are speaking of injury?—Yes.

Mr. R. C. ELSWORTH, M.D., F.R.C.S., called and examined.

8275. (*Chairman.*) You are a doctor of medicine?—Yes.

8276. What is your position in Swansea. You have private practice?—Yes.

8277. Have you any official practice?—Oh, yes; I am a surgeon of the hospital.

8278. Are you a surgeon in the employment of works?—No.

8279. Or workmen?—No.

8280. Have you had any experience as a medical man of pitch disease?—No.

8281. Have you had any experience of heart disease caused by occupation?—Yes.

8282. Will you kindly tell us what your experience has been with regard to heart disease?—It mostly occurs in men between 40 and 50. These men are workmen in steel works.

8283. (*Professor Allbutt.*) The information you are going to give us is derived from your private practice?—Yes; in roller-men in tin-plate works and workmen in steel works. They present symptoms of senile heart at any age between 40 and 50, and these men give me the impression of being at least 10 years older than the age they state. The physical signs are that the patient is less capable of doing his work, and when questioned he simply states he is getting short of breath on going up hill or with extra exertion. He has a peculiar murky skin. The first heart sound is blurred, and the pulse is diastolic, and there is usually some atheroma of the vessels. The majority of cases I see are seen before they get too incapacitated for work, and by rest for a fortnight to a month with the administration of a heart tonic—digitalis—they are very much improved. The heart sounds become much more definite, the blurring is diminished, and the tension of the pulse is increased, and the skin clears up, and the man expresses himself usually as quite well. Then he goes on with his work again for a varying period, and the same is repeated. Yesterday I spent the forenoon in going over some cases. I do not know whether the Commission would care to see them. I saw seven cases altogether between 40 and 52 years of age. Four of the cases showed the condition I speak of quite well, but they have not got yet to the stage where they have asked for treatment. They express themselves fairly well. They remain in this condition for some time, and then gradually they will feel inability to work.

8284. What do the men actually do? What is their employment? What are their acts?—The roller-men, I take it, are employed in lifting hot bars of steel and putting them into the rolls; the hot bar is put between the rolls, goes through, is caught on the other side,

8271. None of these are cases where a man going on working will make himself worse?—These men are on compensation.

8272. This is a different point from what you put. Where a man has warts which may lead to cancer, you have a right to say "You must be operated on. The doctor says if you go on you will get cancer." You can say there must be proper treatment, and if not you will have only small compensation to pay?—If disease is scheduled it will be simply that one disease.

8273. As at present advised, I think you may take that from us. It is the warts leading to cancer and eye trouble. The doctors will have to find a name for it?—As regards other diseases I should not think there are any works where employment is so healthy.

8274. You may take it that the doctors have already told us that. There is no evidence of anything else but this pitch disease.

(*Professor Allbutt.*) The evidence about the eye comes to this—that the expert to whom a case is referred would not be able from mere inspection of the eye at any one time to say whether the disease were due to pitch or not. He would know it was consistent with pitch, but might be due to other causes; but if he had the whole history of the case before him, the man's employment, and the story of the attack, he would then be able in the large majority of cases to decide whether due to pitch or not.

and brought back again, and so on, passing through several sets of rolls. These are bars rolled into sheets.

8285. Steel plates?—Yes; in works it may be anything.

8286. (*Chairman.*) You attribute heart disease to the hardness of the work—the exertion?—Yes.

8287. In fact, the same remark applies to wherever a man works hard?—Yes.

8288. (*Dr. Legge.*) Have you seen this particular work in the rolling mills in tin-plate works?—I have not seen it in tin-plate works, but in steel works.

8289. Do you know whether it is piece work or time work?—I could not say. I think piece work.

8290. Do they ever say they have to work under great pressure?—No; they say hard work, but they do not express themselves as being oppressed in any way with the work.

8291. Do you know at what age they commence this work?—I do not know. The position of roller-man is one attained by seniority. They grow up from boys, and the last stage in their promotion is that of roller-man. Some of these men I saw yesterday—one in particular—have been in the works 30 years, about 10 years I think as roller-man.

8292. Do you know the hours they work?—8 hours a day.

8293. Do you know what the intervals are—whether they have to work in accordance with the firing?—They are kept continually at work. The reason I state that is I asked leave to go into the works and take the men as they are at work, but the management did not care to let me do that, although I know the management, because it would interfere with the men and break into their work.

8294. (*Professor Allbutt.*) You have had experience of men in other works not presenting this appearance?—This is the only type of this heavy continuous work I am acquainted with.

8295. The men engaged in lighter occupations do not present these features?—No.

8296. Do you think these men are specially intemperate?—No; but in steel works and as roller-men they work under considerable heat, and they suffer a good deal from thirst, and there is a tendency to quench thirst with other than water.

8297. Do you happen to recall any cases of this kind in men who belong to any teetotal society, or who are notoriously temperate men?—No; on the other hand, I should not say that the cases I have seen have been immoderate men.

8298. You attribute it more to labour than drink?—Yes.

Mr. S. L. Gregor.

28 Feb. 1907.

Mr. R. O. Elsworth, M.D., F.R.C.S.

- Mr. R. C. Elsworth, M.D., F.R.C.S.
28 Feb. 1907.
8299. You see other workmen who may be drinkers who do not suffer in the same way?—Yes.
8300. It is rather a dilatation of the heart?—Yes.
8301. The symptoms are rather in the mitral area?—Yes; the sound is just heard there.
8302. Atheroma in the aortic region is not a prominent feature?—No.
8303. It is rather dilatation?—Yes.
8304. Affecting both sides of the heart?—Yes.
8305. (Dr. Legge.) Have you spoken to the medical men in the other districts where these men work?—No, I have not. It is a condition that is not very much spoken about here, and the only member of the profession in town I have had any conversation with on the subject is Dr. Griffiths, and he is quite of the same opinion.
8306. (Professor Allbutt.) About these heart cases?—Yes, and the term I have used, "senile heart," is the only one I can use to express it.
8307. (Dr. Legge.) These men tell you they have to give up work about the ages you have mentioned?—No; they don't give up work, but they are bad, and they are prematurely old men. They are restored by treatment, and then have to be treated again. The cases I see come to me usually from the surrounding parts of the town, and I see them only in consultation.
8308. Have you found albumen in the urine?—No; occasionally it occurs—not a constant thing.
8309. Examining men employed in work of this sort, are there any changes in the pulse rate that would guide you?—No. I am very frequently attracted to the point by the colour of the skin of the patients. I have described it as being murky, and the change that comes over the skin after the patient has been treated with cardiac tonics is, as I have often expressed it, "like a boy's skin."

8310. (Professor Allbutt.) Carry the point a little further. This change in the heart is in your opinion to be seen in a man engaged in hard work, as in roller mills?—Yes.

8311. There is nothing to distinguish it from the effects of hard work in other laborious occupations?—I could not say. I don't see those cases.

8312. As far as your opinion goes there is nothing specific about it?—No.

8313. And, so far, it is common to all hard muscular labour. If these men are as you say a thirsty class, is it not in accordance with experience that alcohol and large consumption of beer have a very definite effect in deterioration of the heart?—Yes.

8314. (Dr. Legge.) Can we see these men?—I can arrange for you to see them to-morrow.

(Chairman.) On Tuesday evening and Wednesday we visited several factories for the manufacture of briquettes. The process of making briquettes consists of binding pitch obtained from gas-works and the slack of coal. The mixing these together and exposing them to steam until the pitch is softened binds the powdered coal into a cohesive mass. Out of this the briquettes are made, being pressed while hot into moulds. During the operation of unloading the pitch from ships and from railway waggons a considerable amount of dust arises, and there is more still caused by the operation of breaking up the pitch. The number of men employed in unloading the pitch and in the process of pounding it is small relatively to the whole number employed in the making of briquettes, and undoubtedly the chief danger is confined to those men who deal with the pitch while it is in a powdered condition. On Wednesday we went to examine some tinplate works, with special reference to the fumes and dust which arise at certain stages of the manufacture. We noticed that in some of the rooms there appeared to be a good deal of dust and fumes in the atmosphere.

TWENTY-SEVENTH DAY.

Monday, 4th March 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (Chairman).
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. HENRY CUNYNGHAME, C.B.
Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (Secretary).

Mr. ROBERT OWEN, L.R.C.P., L.R.C.S., called and examined.

- Mr. R. Owen, L.R.C.P., L.R.C.S.
4 Mar. 1907.
8315. (Chairman.) Are you in practice in Carnarvonshire?—Yes.
8316. Have you had special experience of the complaints from which slate quarrymen suffer?—Yes; I have been amongst them for nearly 27 years altogether, and I have had charge of my own practice for 15 years.
8317. Are you giving evidence on behalf of the Miners' Union?—No, simply at the request of Mr. Ellis Davies.
8318. Do you consider that these men suffer from any diseases owing to their employment?—Yes, I do.
8319. From what diseases?—Pulmonary diseases.
8320. Those which you desire the Committee to investigate are all diseases of the respiratory system, are they?—Yes, that is all; I do not think there is any other disease due to any slate dust.
8321. Are these diseases due to dust?—Some of them.
8322. What other causes are there?—The first cause might be exposure. Of course, the fitful nature of a quarryman's occupation makes him perspire, then he

is exposed to draught, a slight cough comes on, and the dust in which he works aggravates his condition, and slight inflammation takes place in the tubes.

8323. Do any of the men work not in a dusty atmosphere?—Yes, those who work in the pits. I may mention that the men who work at the Nantlle quarries are quite differently situated to those who work in the Festiniog quarries.

8324. As to the complaints caused by exposure, apart from dust, are they any different to what other men working in the open suffer from—say farm labourers?—No, in their general symptoms I do not see any difference at all, and I do not believe any medical man could prove, if he examined an agricultural labourer and a slate quarryman, without making inquiries, to what the disease was due, because the symptoms are objectively to the eye and the stethoscope the same.

8325. That is so far as diseases due to exposure are concerned?—Yes.

8326. Therefore, really these men are suffering from

the ordinary ills to which flesh is heir to, and which people who work in the open air are liable?—Quite so.

8327. With regard to diseases caused by dust, do you consider that those forms of bronchitis or phthisis can be differentiated by diagnosis from bronchitis or phthisis in other persons not working in a dusty atmosphere?—I think so, by studying the life history of the quarryman, and if one could have an opportunity of watching them for some time, but seeing a quarryman casually or once, I do not think one could.

8328. Could an expert medical man, who knew the whole history of the case say with some degree of certainty whether a man's ailment was due to dust or not?—I do not think so.

8328*. Not even if he knew the whole history of the case?—He could diagnose the general condition of the lung, but apart from that I do not think he would be able to say what was the cause of the disease unless he knew the man was working in the dust.

8329. Then if he knew the whole history in every respect, and was accustomed to deal with such cases, do you think he would be able to say, "This man's fibroid condition or this man's bronchitis is really due to the occupation in which he is engaged."?—Yes, I think so. As far as the symptoms of fibroid phthisis in quarrymen go, we find them suffering for years, and gradually going down hill.

8330. Do you find a large proportion of the men who work in a dusty atmosphere suffer from these troubles?—Yes, a good many. I will read you a few statistics which I got prepared from the Registrar of our district as to the Nantlle quarries. In the Gwyrfaï rural district the population, estimated in 1906, was 31,500; out of that number there are 6,000 quarrymen. I include Llanberris in that figure, where there are about 3,000 men employed. The death rate for all classes per 1,000 is 17.8, and of persons over 65 4.8 per 1,000 of the whole population; for phthisis in all persons 3.1 per 1,000; for other pulmonary diseases 2.4 per 1,000, making a total for respiratory diseases of 5.5. That is the report of the rural district Registrar. Then I come to Nantlle, a part of the Gwyrfaï district, with an estimated population of 13,612. Out of that number there are 2,500 quarrymen. The number of quarrymen over 20 years of age who died in 1905 of phthisis was 17, bronchitis 4, pneumonia 7, making a total of 28 out of 2,500 quarrymen. I do not include anybody except quarrymen over 20 years of age, because, as a rule, we reckon they are fairly well set at 20 years of age. That gives a percentage of 11.2 per 1,000 for pulmonary diseases in quarrymen. It was a little less in 1906, when the figures were: Quarrymen dying of phthisis 14, bronchitis 3, pneumonia 5, making a total of 22 out of a total of 2,500, or 8.8 per 1,000.

8331. Do you get pneumonia at all with dust?—No, I do not. Of course, there is a special germ or microbe for pneumonia, but the slate dust might prepare the ground for inoculation.

8332. Those men whom you have enumerated as being quarrymen include large numbers of quarrymen, I suppose, who are not working in a dusty atmosphere?—Yes, all the quarrymen—those men who work in the pits—are stronger than the men working in the mills.

8333. Would it be possible to ascertain how many of the workers working in the mills die from bronchitis or phthisis?—Yes, we could give that figure if every medical man would inquire where his patient had been working.

8334. There are not any figures available, are there, showing that?—No, the Registrar takes them all as quarrymen, but, personally, I know every one of these men who died.

8335. Has your own experience been that you have observed fibrosis of the lung to be very prevalent amongst the quarrymen who work in the mills?—Yes, markedly prevalent.

8336. (*Professor Allbutt.*) Do you attach any importance to the sulphur in the slate?—No, I do not think so. I have here a specimen of the slate, and the dust from it is very dangerous when it flies about.

8337. Does this specimen show the veins?—I brought it to show the impurities we find in the slate.

8338. And what bearing has it upon the health of the man?—The parts fly about when it is pulverised by the instrument used—the knife, chisel, or ham-

mer; the dust flies about, makes its way into the nostrils, and so into the lungs.

8339. Shortly, is it irritant to the lungs?—Yes.

8340. Do you mean that the slaty portion is not injurious, but that the vein is?—I believe the vein and the quartz is more irritant to the tubes than the dust itself.

8341. The sulphur is not so important as the mechanical dust, I take it?—We can detect the smell of the sulphur.

8342. But do you think it is injurious?—Yes.

8343. What do you think the sulphur does; is it also an irritant?—It is.

8344. It adds to the irritation, does it?—Yes.

8345. Then you do not think the dust in the slaty portion is injurious?—Oh, yes, it is.

8346. Then you think both are injurious, but the quartz veins the more so?—Yes. We find very little of them.

8347. The veins form really a very small proportion of the whole?—Yes, but you find after you cut across the veins with a knife the dust flies about.

8348. Even if this vein is, as it appears to be, a small element in the dust produced, nevertheless the slate dust without this venous portion is sufficient to set up irritation. And the proportion of sulphur forms on the whole a very small proportion, does it not?—Yes, it does. I have here a sample of the ordinary dust.

8349. (*Chairman.*) Is the work carried on in the open air?—No, in a shed in the mills.

8350. Is the ventilation good in the mills?—Yes. You might call it draughty.

9351. (*Professor Allbutt.*) I have asked you those questions in consequence of the statement you make in your proof, "Slate dust, being inorganic in character, it is more injurious than organic dust, such as cotton and flour." We do not know that mere carbonaceous coal dust, apart from any silicious matter, is injurious to the lungs, do we?—I thought that the dust being inorganic in its character, it is more injurious to the bronchial tubes than if it was nearer to an organic product.

8352. Whatever may be the case with coal, you are certainly of opinion that pure slate dust, even apart from quartz and so on, is injurious?—Yes, I am.

8353. By attaching itself to the walls of the bronchial tubes and setting up irritation?—Yes.

8354. And that this produces a new material which thickens and fills and surrounds the air vesicles of the lung and finally transforms it into a fibroid mass?—Yes.

8355. You make a very important statement later in your proof with regard to expectoration, which you say is often charged with slate dust?—Yes.

8356. Do you consider that it comes from the mouth and upper passages, or does it come from the lungs?—Yes, it is coughed up.

8357. It is not merely in the frothy superficial part of the spittle, but is intimately mixed with the bronchial expectoration, is it?—Yes.

8358. Do you ever find it inside cells?—No, I think not.

8359. The Chairman asked you a question with regard to the distinction between this form of bronchitis and other forms. The examination of the sputum would be of assistance in determining that, would it not?—Yes. Of course, we might find slate dust in it.

8360. Would you go as far as to say it would be decisive?—Yes, I think it would.

8361. Is the tuberculosis which may supervene upon fibrous bronchitis common, or might one observe cases through the whole course without it?—Yes, one might. In one or two cases where I made a post-mortem examination I had permission to see the chest well and the lung, and in that case the man was ill for a good many years; in fact, I attended him twenty years ago for pneumonia, but he hung on and eventually died after being ill three or four years. It was put down by several medical men that he was suffering from tubercular disease of the lung. Then I got the sputum examined

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Mr. R. Owen, for tubercular bacilli; we did not find any, but still, the man was dying. So we considered it a case of purely fibroid phthisis.

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8363. The disease runs its characteristic course without it?—Yes.

8364. Another point in diagnosis on which you would rely, I suppose, is upon the bilateral affection of the lungs?—Yes.

8365. As regards the fibrosis of the lung, do you think fibrosis can be distinguished during life, or is it a matter of presumption?—It is a matter of inference from the objective symptoms you find.

8366. Can you detect solid areas in the lung affected?—Yes, you find them bilateral as a rule, and you find them posteriorly.

8367. The fibrosis is, then, an inference from the physical signs?—Taking everything into consideration, we might fairly infer that we were dealing with a case of fibrosis.

8368. Supposing you had two men both admittedly suffering from this form of disease, could you say which of the two had the more fibrosis?—No, I do not think you could without taking everything into consideration—the duration of the disease, and so on.

8369. Then your inference that fibrosis is present depends upon your general pathological knowledge rather than upon the examination of the particular patient?—Yes. I have had an opportunity of seeing two cases, and tuberculosis was a secondary feature.

8370. Is there any fever in these cases?—No, it is not a characteristic of them.

8371. And accordingly there are no emaciation and night sweats as a rule?—There will be emaciation, but not night sweats until within a short time of death. Emaciation continues for some time.

8372. What is the ordinary duration of a case of this kind?—It depends on the circumstances and the opportunities of the patient.

8373. Would it be five years or fifteen years?—I do not think I could put any duration. Of course, if a man is able to take care of himself, go for a holiday, keep the disease off, go to work again, he may linger for a long time, whereas a poor man could not do the same. I am not prepared to say how long it continues; it depends entirely on circumstances.

8374. But you have a rule of thumb impression, if a man comes to you and asks you how long he is likely to live if he continues at work, have you not; whether a very short time or a very long time?—I do not think I could put an estimate on it.

8375. For some time it would not incapacitate him, would it?—No, not for some years.

8376. Do you think he might go on working for, say, five years?—He may be able to do more than that.

8377. For ten years?—Yes.

8378. These troubles in the lungs lead secondarily to heart failure, do they not?—Yes.

8379. In the returns of deaths cardiac changes would take rather a prominent place among slate workers, I suppose?—Yes, and we find a good many deaths from heart failure and heart diseases; I think they might be secondary to this fibrosis.

9380. In the photograph slide which you produce we see pulmonary tissue, and scattered about in the tissue there are yellow masses and streaks—how do you interpret these; they are the morbid part, I presume?—Yes.

8381. Then the dust works into tubes as minute as those, does it?—I think it does.

8382. Was there dilatation of the large bronchial tubes, in consequence of the fibrosis, in the two post-mortems you made?—No, I think not. I mention it as an inference rather.

8383. Are you able to furnish us with reports of the post-mortems you made?—Yes, I can read them now from my notes: "Report of the post-mortem R. R., 48 years, slate quarrier, working in a quarry for 25 years. Permission only was given to open and examine the chest. The body was that of a man over 6 ft., very emaciated, and looked 10 years older than his age. Frequent attacks of brachitis during the

last 20 years. Three years before he died he began to lose flesh, and was short of breath. Bronchitis followed by a good deal of expectoration, which was muco purulent; when his complaint was far advanced he was told that he was suffering from tubercular consumption, but when his sputum was examined, which was done repeatedly, no tubercle bacilli was present. Then the thought occurred to us that the patient was suffering from non-tubercular disease of the lung—that is fibrosis. He became weaker; Bright's disease followed, and he soon died." That is the history of the case. On examination the right lung was adherent to the chest wall. The adhesions were so thick and firm that they had to be cut with a knife. The pleura was adherent. The lung did not collapse when removed from the body. The left lung was not adherent to the chest wall. In the right lung the pleura was very thick. The bronchi of both lungs were greatly thickened, and surrounded by dense bands of fibrous tissue. Both lungs were diminished in size; they were hard and dense, almost like cartilage. Both lungs were somewhat of a buff colour, but there was no distinct pigment observed. The bronchi contained much mucus and pus. On microscopical examination of the lung it was found to be a real specimen of fibrotic lung tissue. This is partly a report I had from Glasgow, where I sent a tissue to be examined. The walls of the air cells were thickened, also the walls of the minute arteries were in the same condition. The bronchial glands were enlarged (that is my own observation), and of a peculiar colour. They were nothing like the glands you find in a coal miner. In this case no tubercular cavities were found; there was no breaking down of the lung. The second case is not so important, as tubercular disease supervened, but the general condition of the lung was the same. I made no microscopical examination in that case.

8384. Generally, in your opinion, so far as you can judge, and in the absence of proof by post-mortem examination, from what you have clinically seen do you believe that the symptoms are characteristic of the disease?—I do.

8385. (*Dr. Legge.*) Do I gather that of this list of chest diseases which you mention, the one that includes them all, in your opinion, is the last—fibroid phthisis?—Yes.

8386. And that would include the bronchitis if it occurred?—I refer to bronchitis as an acute attack.

8387. May we disregard that then?—Yes.

8388. But there is a bronchitis associated with fibroid phthisis, I suppose?—Yes; you never see a case of fibroid phthisis without bronchitis.

8389. So that it would include the bronchitis when the men were incapacitated from it?—Yes.

8390. Would it also include pneumonia?—I point out pneumonia as acute.

8391. So that it might be excluded?—It might be excluded.

8392. And asthma?—That might be accompanied with the fibrosis.

8393. Have you ever known cases which you have diagnosed as fibroid phthisis, where the men have left the work and got apparently quite well?—Yes, I have seen farm labourers go into the quarry, where they work for a couple of years, and then have to leave, as they are not fit to stand it, but they soon get better.

8394. They do not go from bad to worse?—No, except in the case of the Festiniog quarries, where they work underground, and where they soon get pale and thin.

8395. By "soon," do you mean in the course of five years?—Less than that.

8396. Many must be working there now who are in this condition, I suppose?—Yes; in fact I have five or six cases now who are in the last stage of consumption.

8397. Supposing this condition were scheduled as a disease for which compensation should be payable, do you imagine that many of these men would be discharged?—Yes, in my opinion, I do not think it would be advisable to put them down for compensation.

8398. Why?—Because it is so very difficult to prove, and the condition might be caused by something else.

8399. But would it not be better for them to be made to leave the work than to go on and contract the

disease, and go from bad to worse?—Yes, but you would throw almost the whole population out of work.

8400. Are there many other medical men in practice in your district besides yourself?—Yes, there are five.

8401. And you say, I understand, that you have five or six people under treatment now?—Yes.

8402. Do you suppose the other medical men also each have five or six people under treatment?—Yes, it might be so.

8403. So that there would be 35 out of a total of 2,500 under treatment?—Yes, I have charge of about 800 quarrymen, so that I have to deal with a third of the total number.

8404. But the number you attend is not 1 per cent., is it?—No.

8405. (*Professor Allbutt.*) Have you 800 mill men under your care?—No, quarrymen as well as mill men.

8406. How many mill men do you think you have under your care?—About 600, I suppose.

8407. Do they move about between the mill and the quarry?—Yes.

8408. (*Chairman.*) Out of the 800 men under your care how many are mill men?—The total number of slate quarry men is 2,500, one-third being employed in the mills—that is 800.

8409. Then out of the 800 quarrymen under your care something like 270 would be mill men?—Yes.

8410. And out of them you have four cases?—More than that. I have three or four in the last stage.

8411. (*Dr. Legge.*) Still working or incapacitated?—Incapacitated; in bed.

8412. Are the others you attend still working?—Yes. I consider the mills as a kind of convalescent ground for these quarry men they are not fit to go to the pits, but they can hang on at the mills, do what they like, and earn as much as or as little as they like.

8413. (*Chairman.*) But there is more dust in the mills, is there not?—Yes.

8414. And therefore it is more dangerous, is it not?—It is more dangerous; they go there simply to die.

8415. (*Dr. Legge.*) Can you give us any idea as to how long the men in the last stage have been under your treatment?—Yes. One man, aged about 24, two years ago had an attack of bronchitis and some slight congestion of the lungs; he worked about a year after that, but six months ago he had to give up his work, and is gradually dying.

8416. Had he worked there for 10 years?—Yes.

8417. And you have no doubt that it is fibroid phthisis?—It might be accompanied with tubercle; I have not examined his sputum, but I intend doing it.

8418. Is that an exceptionally young case?—It is the youngest of the five or six I have in my mind. But I remember a few others that very likely I shall have some trouble with.

8419. Have you ever seen an analysis of slate dust?—No.

8420. (*Mr. Cunynghame.*) The disease of which we are speaking at this minute is fibroid phthisis, arising from dust, is it not?—Yes.

8421. If that or something equivalent to it was put into the schedule, do you anticipate at once considerable hardship to the old men?—To the younger men. We find the disease mostly in the middle-aged men.

8422. I will put it with regard to men who have it already, and who would probably be discharged?—Anybody with a cough or a slight catarrh might be stopped at once.

8423. Can you suggest any means whereby this hardship could be obviated?—No, I do not think I could suggest anything.

8424. Would it be any good to postpone any operation of the particular schedule for a certain number of years?—At present I would advocate that. I do not think we have sufficient proof that slate dust causes the fibrosis, though in my own mind I believe it does.

8425. Do you mean you do not consider it proved, although it is your belief?—Without more microscopic and post-mortem examination I would certainly postpone the matter.

8426. Do you mean it is more a suspicion in your mind than an absolute scientific demonstration?—In my opinion I think I have sufficient ground in the case I have examined for saying that the fibrosis was certainly proved, for the man had been working many 4 years in the slate dust.

8427. Suppose it was proved, do I understand you to say it would be better to put off the insertion in the schedule of this particular disease for a time in order to give a period of respite to those who are already in, and who might be discharged?—My own opinion would be to postpone it.

8428. Then you suggest, do you, partly for the completion of the proof, and partly to enable people to make their arrangements, that you would postpone it?—Yes.

8429. Could you give us an idea of the number of years, supposing it to be postponed, it would be necessary or expedient to postpone it on the ground of giving an opportunity to those who are in the business to make arrangements to get out of it?—Seeing that the disease lasts for so many years I should certainly postpone it for five or seven years.

8430. Do you mean, even admitting it was a disease, it would be best to have it postponed for five or even seven years before any proceedings came into operation?—Yes, and trying to see the case proved by post-mortem.

8431. (*Chairman.*) You said, I understood, if this disease were scheduled, the effect would be that half the population would be thrown out of work?—Yes, they would be under suspicion if they had a cough or slight catarrh.

8432. But the employers would have to get their work done by somebody—is there an absolutely unlimited supply of labour?—That, of course, is true, but it would be a great hardship on the ordinary worker, who might live for many years with this disease, whereas if the manager were to spot him coughing, and getting thinner, he might discharge him.

8433. (*Professor Allbutt.*) Then what he would do surely would be to refer the case to a medical officer concerned with the men, would he not. Is there a regular medical attendant at these quarries?—Yes.

8434. Then in the case of a mere ordinary catarrh the opinion of the medical man would be that he was not suffering from phthisis, would it not?—But he would not be able to prove it.

8435. But his opinion would be that he was not suffering from phthisis, and I gather from such statistical evidence as you can give us that the number of cases in which a medical referee would definitely say: "This man, in my opinion, is suffering from phthisis," is very few?—Very few.

8436. Therefore one does not quite see that the opinion of the medical man—because, after all, it would come to that in the end—would disorganise the trade, if it only went against a small fraction. It is a very serious thing that these men should be allowed to go on dying under these conditions, is it not?—There is no doubt the proportion is high—11.2 per 1,000.

8437. We have had evidence, not merely from yourself, to the same effect—from another witness, and it is a large problem. It does not apply merely to slate, but to a large number of industries, and it appears to us that although postponement may be wise, it is a very pressing question. Do not you think, therefore, you are a little undervaluing the assistance medical men could give in these cases, the assistance they could give to the employers. No doubt the employers would organise some system of medical examination, and it appears to me that a medical man would be of great assistance in discriminating cases which are genuine, and in cases of suspicion they might test the man after another year, might they not?—Yes, we might pass an opinion that a man might be able to work for some years.

8437*. And in a large number of cases it would turn out that the case was not one of dust phthisis, but one of a more transitory kind, I suppose?—Yes.

8438. After some preliminary experience it does not appear to me that the amount of men thrown out of employment would be very large?—It would create a great calamity at the beginning.

8439. Are you prepared to go into the inquiry why the dust is not removed?—I have thought about that. I have been connected with the quarries

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all my life, and I know the trade pretty well, and the matter of removing the dust is very difficult.

8440. Do you not know that it has, during the last five or ten years, been dealt with very successfully in a large number of industries?—Yes.

8441. Would not that be possible here?—The slate dust is very heavy, and whatever process we use as a ventilator at the top of the mill it is very difficult to drag it away without causing very severe draught.

8442. You mean ventilating the building. I dare say you have seen hoods of various kinds which are used in dusty occupations. If some kind of hood could be applied to the sawing machines in the mills with a strong draught do not you think the dust could be removed?—It would be very difficult to employ hoods, I think. Water, I thought, might be a great help to lay the dust, but that again in summer dries up quickly.

8443. In sawing slate, like sawing stone, I suppose water is used, and the dust is wet, yet some of it rises?—Yes.

8444. But it must get dry before it rises?—In winter, of course, they do not complain so much.

8445. In going round the mills do not you think you would find on the ledges and on the floors quantities of dry slate dust?—Yes.

8446. Why is it there?—Because it is so very heavy. It does not go up, and you find the rafters very clean.

8447. But it rises as high as the men's faces by allowing the dust, which is wet when formed, to get dry?—Yes.

8448. (*Chairman.*) You said you thought all these diseases from which men suffer through their employment might be covered by the term fibroid phthisis,

but do you never get a case of a man incapacitated from work through simple bronchitis, which is due to his dusty occupation?—Yes.

8449. Would you consider that to be a case of fibroid phthisis. It might develop into one later, but should you say it was at the time?—I take all the signs and symptoms into consideration. As a rule, bronchitis is only a fitful attack, but in fibroid phthisis you never get rid of it.

8450. Supposing you have a man suffering for two or three weeks from bronchitis, which you think is due to his dusty occupation, should you say it was a case of phthisis. There is a distinction, is there not, to be drawn between the two things?—Yes.

8451. You said, in answer to Dr. Legge, that all these respiratory diseases from which the men suffer owing to their occupation might be put down under the one head "fibroid phthisis"—is that what you really wish to convey to the Committee?—I would not like to say that, because I am sure I could detect a good many cases of bronchitis alone without traces of fibroid phthisis with it.

8452. Which is due to the dust?—The dust might aggravate it.

8453. (*Dr. Legge.*) But it would be more difficult to say in bronchitis it was due to dust than in a case of fibroid phthisis?—Yes, bronchitis might be caused by exposure to the cold, and the dust might aggravate it.

8454. Is bronchitis due to slight exposure to cold more difficult to diagnose than bronchitis which is due to fibroid phthisis?—I do not think there would be any difference at all, except that the bronchitis from exposure would get better, and the bronchitis along with the fibroid phthisis would never get better.

Mr. A. ROWLEY MOODY, M.B., called and examined.

Mr. A. R. Moody, M.B.

8455. (*Chairman.*) Are you a medical man in practice in Staffordshire?—Yes.

8456. Are you giving evidence here at the request of the Miners' Federation of Great Britain?—That is so.

8457. Have you had many years practice amongst miners?—Yes, since 1884.

8458. Are you able to tell the Committee the diseases from which they suffer?—Yes.

8459. First, with reference to nystagmus, have you had in your experience many cases?—Yes, a considerable number.

8460. Do you consider that it is an easy and a simple thing to determine in any given case whether it is nystagmus or not?—I think so.

8461. An expert oculist could tell, could he, in all cases?—Yes.

8462. Do you think it is possible to imitate the symptoms of nystagmus?—I think it is impossible.

8463. Are you of opinion that this disease arises, in the case of miners, from their employment?—Yes, absolutely so.

8464. Nystagmus may arise from association with other diseases, I suppose?—Yes, a disease of the spine or brain, or from imperfections of sight at childhood.

8465. Do miners suffer from those diseases of the brain and spine and ailment of the eyes in childhood like other people?—They do.

8466. Therefore you might come across, here and there, a case of nystagmus due to either of those causes and not from the occupation?—I have seen cases which I believe have been hastened by diseases of the eye in childhood, but I think it would be almost impossible to expect to find nystagmus from a disease of the brain or spine in a working miner.

8467. Why is that?—Because the diseases would incapacitate him from being a miner.

8468. Would it be easy in such a case to show that the nystagmus did arise from brain or spine disease, and not from the occupation?—Quite easy.

8469. In any case, I presume such cases as that would be exceedingly rare?—Exceedingly rare.

8470. Are you of opinion, speaking on behalf of the Miners' Federation, that this disease ought to be made a subject for compensation?—I quite think so.

8471. Do you think it would lead to many men being

thrown out of employment on the ground that they were likely to suffer from nystagmus?—Not in most mines. Where thin seams are worked, as in the Sheffield district, cases are undoubtedly more frequent.

8472. Do you think that it might sometimes happen that employers would require their men to submit to examination by an oculist, and if it were found they were developing nystagmus, that they might be dismissed before they were incapacitated?—I do not think it would.

8473. In any case, you think it might be better for a man to lose his employment than to become incapacitated by nystagmus?—Or to incur danger in a mine through it—I think so.

8474. (*Professor Allbutt.*) Does nystagmus always incapacitate the miner?—No, I do not think so.

8475. Are there any means of distinguishing between the malingerer who has nystagmus, but who could work, and the man who has nystagmus which incapacitates him?—I think it is almost impossible. The only way I would be able to judge would be by the past history of the man.

8476. Do you think the number of cases of nystagmus which do not incapacitate, but which might lead to incapacity, form the larger proportion?—No, I think not. I think if a man complains, he is incapacitated, in my experience.

8477. As things now are?—Yes.

8478. But I am assuming compensation to be paid to these men, which would bring them up to a very much larger number, would it not?—My experience is gained, to a large extent, from men who have come to me for help in their trouble.

8479. I am assuming the Act to be in force, and the sufferers to be entitled to compensation. A man with nystagmus, who would now go contentedly on and not be much the worse for it, would have it open to him to say, "I am incapacitated by it." Can you contradict him?—I do not think you can.

8480. Can you say whether, of the whole number of cases of nystagmus, such cases of false allegations might be a large proportion?—I think they might.

8481. (*Chairman.*) Turning to the question of beat hand, the Committee have had previously in evidence the symptoms, but do you find men obliged to give up their employment for a time through beat hand?—Rarely only.

8482. But sometimes they are incapacitated, are they?—Sometimes they are.

8483. For how long a period?—Of course, the incapacity would last until the conditions were removed.

8484. About how long does that take, as a rule?—I should say three weeks if submitted to operation.

8485. Do you think that is a proper subject for compensation?—Yes, I think so; I believe it is due to the miner's trade. It is not a special thing, peculiar to miners only, but still, I believe it is due to their trade.

8486. May the same thing be said of beat knee?—I think so; that is exceedingly common also in the thin seams, where the men have to go about much on their elbows and knees.

8487. Is there a beat elbow also?—There is a miner's elbow.

8488. Does that incapacitate from employment?—Yes, I think more so than beat knee.

8489. Then ought not that to be certainly scheduled if the other things are scheduled?—I think so.

8490. What are the symptoms of the miner's elbow?—The bursa at the back of the elbow joint gets enlarged and painful, and the men using the elbow as a fulcrum in working cannot continue to do so.

8491. And is a man stopped from working altogether?—Yes, he is stopped from working altogether, or if it gets chronic he works under difficulties.

8492. Do you get chronic cases of beat hand and beat knee?—Yes, they are mostly chronic.

8493. Does the hand or the knee get worse from time to time, and incapacitate the man?—It gradually gets worse until it is interfered with. I see the same thing with horses, not men. A horse runs on his finger and it is a common thing to see a London cab horse with this knee bent over. That, I believe, is due to the contraction of the flexor fascia from the concussion with the iron hoof on the roads. That is a similar thing to the miner's beat hand.

8494. Can you differentiate these three injuries, beat hand, beat knee, and miner's elbow, from any other similar ailments with certainty among people with different occupations?—No.

8495. Are there any injuries to the hand, knee, or elbow, which so closely resemble these that it would be difficult to say in any given case, "This is a trade injury, and is not one of the ordinary ailments that most people suffer from"?—It is possible that rheumatism may affect the flexor tendon, and I believe does do so, but it would be quite easy to find out whether it was the palmar fascia or the flexor tendon which was affected.

8496. Do you think any medical man could differentiate the two things?—Yes, I think so.

8497. (*Professor Allbutt.*) Do you regard miners' beat hand as the same pathological process as that which is generally known as Dupuytren's contraction?—I do.

8498. Do you meet with any conditions of the palm of the hand leading to deep suppuration in miners?—I have seen it.

8499. That is not what you call beat hand?—No, I believe that is frequently caused by small particles being forced in.

8500. May I take it that whatever you call it, it is a disease upon which you have tendered the evidence you have given; but that there is also another malady, to which you have given the name of beat hand, which is identical with Dupuytren's contraction?—Yes. When I say beat hand, I mean Dupuytren's contraction.

8501. Anyone who handles a tool may suffer from it?—Yes. I have seen it in horse collar workers and golfers.

8502. Do you know the view taken in Scotland of beat hand?—No; I cannot say that I do.

8503. That the name signifies only the acute inflammatory condition, and not the chronic Dupuytren's contraction form?—No, I was not aware of that.

8504. (*Mr. Cunynghame.*) Is it like writers' cramp in any way?—No; quite different.

8505. (*Chairman.*) Taking cases of poisoning by carbonic oxide, how long does the incapacity last in that case?—Not very long, in my experience, when the men are removed from the poison.

8506. It never lasts so long as a week?—No.

8507. Therefore a man suffering from it could not be the subject of compensation?—No.

8508. Then I presume it is a sudden poisoning, and is caused by accident?—Yes, or by working close to a gob fire. Those are the cases in which I have had it observed when it slowly comes on, and not in an acute form. Mr. A. R. Moody, M.B.
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8509. (*Mr. Cunynghame.*) You said "slowly comes on"; but if it were an accident, it would be sudden, would it not?—It comes on in the course of a few weeks, working where the men are exposed to the gases which are produced by a gob—that is, the imperfect combustion of carbon.

8510. What are the effects—sudden prostration?—Not sudden, but gradual.

8511. Then it is not an accident?—That would not be an accident.

8512. Then you say it is a disease, do you?—Yes; it produces a diseased condition of the blood.

8513. How long does it last?—The effects pass away pretty quickly when the men are removed from the poison.

8514. Do they always last less than a week?—I do not say always less than a week, but it would take a comparatively short time to get them right.

8515. Does it seem worth scheduling as a regular chronic trade disease? Assuming a miner is overpowered by an accident, he gets compensation under the accident clauses. Is it worth while specifying it as a miner's disease?—I do not think it is.

8516. (*Chairman.*) Have you ever come across a case in which a man was prevented from working for over a week by it?—No; I have known many cases where the men have not been able to work on to the full of their powers, but I have never known a case where a man has been away more than a week.

8517. With reference to fibrosis of the lung, are you of opinion that coal miners contract this disease through the inhalation of coal dust?—I am most strongly of that opinion.

8518. Have you come across many cases yourself?—Yes; many.

8519. Were they cases in mines where the seams are pure coal, or were they in mines in which there is an admixture of stone, or some other mineral with the coal?—They relate to all—pure coal, coal mixed with iron-stone, and coal and stone.

8520. Have you yourself come across cases of miners suffering from fibrosis of the lung who have been engaged exclusively in mines where there is nothing but coal?—Yes.

8521. Are you quite convinced that coal dust is an irritant of the lung that would cause this disease?—I am quite sure of it.

8522. (*Professor Allbutt.*) To an incapacitating degree?—Yes, at a certain age.

8523. (*Chairman.*) What age?—After the fifties.

8524. It is not in any sense a deadly dust, like the dust of silica or steel, is it?—I believe it is equally fatal in the end, but it takes longer to produce the results.

8525. How long?—As I say, I believe the incapacity begins after fifty, and between 55 and 65 it is marked, and the mortality as well.

8526. That is as to men who have been employed in the mines for a long period, is it?—Yes. Of course, you have always to take this into consideration with miners: it is very arduous work, and when their powers begin to fail, they quit that work and find something easier. In our own district, for instance, it is extremely common for them to come out of the pit, take a small shop, or a horse and cart, or get work as labourers at the pot works, attending the machinery, and in the small villages they look out for small holdings, so that these men are withdrawn from the mortality returns when they die of chest complaints, and are not entered as miners.

8527. Do you think a change of occupation is beneficial to their health?—Most certainly, as they are removed from the dust.

8528. And they might go on for years, or may even die of old age, might they?—Occasionally they might, if they come out early enough. With regard to potters, they remain on up to the last in their trade in which they began, but with miners the work is so

Mr. A. R. strenuous that when once their powers begin to fail
Moody, M.B. they must come out.

4 Mar. 1907. 8529. Do you consider that this disease ought to be scheduled?—I do.

8530. If it were scheduled, how could you determine at what moment a man was incapacitated from following his employment?—I would be quite content myself if it were included, with the condition that not until 50 should a man be eligible. It seems that after that age the effects of the inhalation begin to be most markedly shown. I think, seeing the enormous number of miners that suffer from respiratory diseases, they will suffer an injustice if it is not included with some limitation. I should like to say that my impression is strongly this, that, contrary to potters' so-called phthisis, which is a diminishing quantity, with regard to miners it is far otherwise, and it is an increasing quantity, for which reasons can be given. I see no prospect, without it is included, of getting the conditions ameliorated. There is no doubt that after the passing of the Coal Mines Regulation Act, improvement took place up to a certain point; but beyond that it has stopped, and there are reasons why the miner works now under less advantageous conditions than he did some years ago.

8531. What are the reasons?—In the first place, 20 or 25 years ago, miners were recruited mostly from the agricultural classes; now, to a large extent, they are recruited from town-dwellers, whose resistance to disease is not so great. In the next place, the small mines have been eliminated; they are becoming very extensive; their workings extend to tremendous distances of superficial area and depth. The difficulties in the way of ventilation are, of course, largely increased, and the mines, many of them have got extremely dry and dusty. Those are the things which I think, in the main, are responsible for the increasing number of miners who suffer disability and disease, and, eventually, death from respiratory troubles.

8532. If this disease were scheduled, do you think employers would have a medical examination of their workers, and any they found likely to suffer from phthisis would be dismissed, to avoid the payment of compensation, which might involve the payment of half wages for a period of 10 or 20 years?—I do not think they would dismiss them. Of course, that is a thing I should not like to express an opinion exactly upon. I do not think the miners themselves would allow grave injustice to be done.

8533. (Mr. Cunynghame.) You said that it was an injustice that men over 50 who had this disease should not be compensated, did you?—I think it would be unjust.

8534. Why would it not be equally unjust to men at 30?—Because the effects of the inhalation are not shown until they reach 50, or over.

8535. But surely some men get fibroid phthisis at 30 years of age?—Most decidedly.

8536. Then ought not they, in justice, to get compensation?—Yes, but the cases are very rare.

8537. According to your scheme, by limiting it to men over 50, you would cut out anybody under that age, would you not?—I would, because I think it would be so difficult to get it included for all ages, and so difficult in the earlier stages to differentiate from other diseases.

8538. Then do not you think it is likely every employer would request every man to discontinue work at 50 without any medical examination at all?—Yes, he might.

8539. Then I am afraid your scheme would deprive everyone up to 30, and according to your view everyone over 50, of any advantage, so that there would not be very much left if it were adopted, would there?—There would not, under the conditions suggested.

8540. Have you any statistics showing phthisis in miners?—No, I have no statistics.

8541. Are you aware that, generally speaking, the miner's trade is one of the most healthy in the country?—Yes, they are an exceptionally strong lot of men, and exceptionally temperate.

8542. Have you any ground for thinking phthisis is more prevalent amongst them than in other trades?—Phthisis is less, but respiratory diseases are greater.

8543. Would you call asthma a respiratory disease?—Yes.

8544. And bronchitis?—Yes. Do you speak of tuberculosis when you say phthisis?

8545. Yes, I mean what is called consumption, which arises from tubercle bacilli, and not from dust. Am I right in so understanding?—Yes.

8546. But it is different from asthma and bronchitis?—Phthisis means tuberculous consumption.

8547. A little more than that, I think, does it not? It would be equally phthisis if got from dust, before tubercle supervened, would it not?—I would not call it that. I should call it anthracosis in the case of the miner, and silicosis in the case of the potter.

8548. The statistics do not seem to show that the miner is any more unhealthy, even from phthisis, or silicosis, or any other thing than the remainder of the population?—The only figures we can go by are the Registrar-General's returns, which show the exact opposite.

8549. Have you those returns with you?—Yes, I have. I have the supplement to the 55th Annual Report of the Registrar-General, for the year 1897. Taking the agriculturalist as the standard with regard to diseases of the respiratory system, the figures are 115.

8550. 115 deaths per 1,000?—It is a comparative figure.

8551. Taking the agriculturalist at 115, what is the figure for the coal miner?—269. Then, taking occupied males at 100, the diseases of the respiratory system in the mining industry generally is 121.

8552. According to your own view, it would not be fair, would it, to compare the miner with the agriculturalist, because, as you have explained to us, they are now recruited from a different population, and therefore the ratio of 100 to 121, I suppose, would more correctly represent the real ratio?—Yes, that is so.

8553. You would not put it higher than that?—No.

8554. (Professor Albutt.) In my experience of practice in a mining district in the West Riding of Yorkshire, we used very commonly, indeed, usually, in the bodies of miners to discover the lungs very thickly charged with a carbonaceous deposit, so that they were very deeply pigmented and black, but this of itself did not signify any pulmonary disease. I am not contradicting what you have stated, but it need not necessarily set up disease, need it?—I think eventually it does.

8555. But still, every coal miner has an enormous quantity of it in his lungs, whatever age he may be?—That is so. Of course, one always has to bear in mind that coal is not pure carbon.

8556. But a person may have lungs as black as a hat, and yet not necessarily suffer from disease of the lung?—Yes. A Londoner's lungs are black.

8557. Therefore may not one assume that the carbonaceous deposit is comparatively harmless?—One might think so.

8558. Have you, or have you not, any large opportunities for post-mortem examination in these cases?—I have seen a good many.

8559. Can you tell the Committee shortly what you have discovered in an autopsy of a case of chronic pulmonary disease which you have attributed to coal dust?—My examinations have not been made with the direct object of finding the condition of the man's lungs, but mostly for other purposes. The conditions were that the man's lungs were extremely black, and fibrous tissue had invaded and taken the place of the lung tissue in certain parts; in some cases (one or two, at any rate) small cavities had been formed which, at any rate, did not have the appearance of ordinary cavities coming on in tubercular phthisis.

8560. Cavities formed by dilated tubes, I suppose?—Yes, and there were emphysematous patches, and affection of the pleura in places.

8561. That being the case, and that there is a certain amount of fibrosis set up by the presence of dust, but that there is, generally speaking, no dilatation of the bronchial tubes, would you be of opinion that a man would thereby be incapacitated?—No, I do not think he would be at that time.

8562. It is a question of degree, I suppose?—Yes.

8563. And only in a very few extreme cases a man would be incapacitated by such pulmonary disease.

Let us assume that a man with a carbonaceous lung could not be called healthy; and we might go further, and say that in a considerable number on microscopical examination the lung would be found to have deteriorated somewhat; yet the number of cases in which the injury goes on beyond that, leading to dilatation of the bronchi and probably to incapacitation, would be very few, from your experience?—In my experience those conditions result eventually in a large number of cases.

8564. (*Mr. Cunynghame.*) You say, do you, that the dust of the mines is rather deleterious to the men?—Yes, in all coal mines.

8565. If that is so, how about phthisis, which would be, I suppose, a disease from dust, is it not?—No, it is got from germs; the dust would only pave the way for the germs.

8566. Coal miners are remarkably free from phthisis, are they not?—That is so. They are exceptionally strong men.

8567. No, you said they were drawn from the ordinary town population?—I did not say they were the ordinary town population. I said they were recruited from town dwellers, but still they are exceptionally strong men.

8568. If that is so, why do they not resist the diseases of the respiratory organs as effectually as they seem to resist the phthisis? Why do not they show their strength all round?—For the reason that they are exposed to dust far more than the ordinary population, and not in excess of the ordinary population exposed to germs.

8569. You admit, do you not, that phthisis is caused by dust?—No.

8570. Then when you come to tin miners, who are also exposed to dust, how do you account for the figure of 275 as against the 100?—Because there you get poisoning in addition.

8571. Do you mean that it is really tin poisoning, as well?—No, but their capacity is so undermined by the poisoning from the tin and arsenic, as well as by the dust they inhale, and foul air.

8572. In considering the effects of dust on any mining industry, would it not be fair to add together the phthisis and the ordinary respiratory diseases?—No, I think it is fairer to separate them.

8573. Then, according to you, the tin miners' figure of 275 for phthisis is not due to dust at all?—Yes, I think dust injures the lung, and deteriorates its resistive power to the tubercle.

8574. Do not you think the figures showing the remarkable freedom of coal miners from phthisis, and the remarkable liability of tin miners to phthisis, illustrates the fact that the dust of coal mines is not dangerous?—I do not. The dust of tin mines is no doubt dangerous and irritating, but it is also poisonous.

8575. (*Professor Allbutt.*) Is it not true that among tin miners who go from Cornwall to South Africa, phthisis is far more frequent than in those who remain at home?—I believe the conditions under which they work in South Africa, of exposure to almost pure silica dust, are very severe.

8576. (*Chairman.*) Under the head of phthisis in this table, would not fibroid phthisis be included?—I think it is included; it should not be.

8577. Is not that a disease due to dust?—Yes.

8578. If fibroid phthisis is a disease prevalent largely among miners, how is it that out of all the phthisis

put together you have the coal miner showing a number of 59, as compared with occupied males of 100?—I really cannot say whether phthisis includes fibroid phthisis, but the terms are so mixed up with regard to phthisis that I have excluded phthisis and dealt with respiratory diseases. Of course, anthracosis and silicosis and ganister disease are not phthisis.

8579. I see that in a table in which 20 different occupations are given the mortality figure starts with agriculturists 221 from phthisis and diseases of the respiratory system together, and the ironstone miner is the next lowest, then the carpenter, then the coal-miner, the figure going up to 366, and that of the other occupations, including chimney sweep, zinc worker, and gunsmith, are very much higher than that of the coal miner, going up to 1,001 in the case of the potter and earthenware manufacturer. Does not that tend to show the coal miner, the carpenter, and agriculturist are freer from phthisis and diseases of the respiratory organs than those engaged in other occupations?—They are freer, but they suffer very considerably as compared with occupied males.

8580. (*Dr. Legge.*) Do you agree that fibroid phthisis damages the lung, and makes it become a more suitable soil for the tubercle bacillus to develop in when it gets there?—Yes; for any germ invading the lungs.

8581. And in all these industries where there is fibroid phthisis, the damaged lung has formed a more suitable soil, and the phthisis figures are in excess?—If phthisis is added to the fibroid condition.

8582. If that is so in the case of the tin miner and the potter, does not that tend to show that the lungs of the coal miner do not get fibrotic, and are not damaged so as to form a suitable soil for tubercle bacillus?—They are not working under the same conditions.

8583. A tin worker is working in tin ore?—Which is metalliferous.

8584. No; it is silicious, that is all. You are in a pottery district, are you not?—Yes.

8585. Do you come across potters' phthisis—fibroid phthisis which appears in potters?—Yes.

8586. Have you seen a *post-mortem* case?—Yes.

8587. Are the conditions different there from those in the coal miner?—Yes; they are more accentuated and exaggerated, and come on earlier.

8588. You said, I think, that coal miners when they found they could not continue heavy work went into the pot banks?—They do not go into the works, but act as odd labourers, round the ovens, and so on.

8589. Do not they get employment as biscuit placers?—Yes. I have known them do that; but that is before their powers fail.

8590. As biscuit placers, do not they get exposed to silicious dust?—They do; but the pitman who does that work must be a strong, vigorous man.

8591. But it takes time for a silicious dust to act, I suppose?—Yes. I should like to correct my answer as to biscuit placers. I do not think a failing collier could take that work up as a resource, because it would be beyond his working powers.

8592. Ganister is the next seam to the coal, is it not?—Yes.

8593. If you get ganister you must be near coal?—Quite so.

Mr. A. R. Moody, M.B.
4 Mar. 1907.

TWENTY-EIGHTH DAY.

Tuesday, 5th March, 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).
Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.
Mr. T. M. LEGGE, M.D.

FRANK ELLIOTT (*Secretary*).

Mr. FREDERICK HOWARD BROOKE, called, and examined.

Mr. F. H. Brooke. 8594. (*Chairman*.) Are you engaged in the ganister industry?—Yes.

5 Mar. 1907. 8595. Will you tell me about how many men you employ?—I employ 160 miners and 220 workmen in the brickworks and ganister grinding works. That business covers many other things such as fireclay and work in stone quarries.

8596. In reference to miners, are these men engaged, as a rule, throughout their lives in ganister mines?—No; as boys they are mostly engaged in other industries.

8597. At what age do they come to the ganister mine?—There are a few boys of the ages of from about 12 to 13 engaged as pony drivers; then you come to boys of from 15 to 16 up to 21 years of age engaged as trimmers.

8598. Do they then become miners?—They become miners.

8599. Do they, as a rule, stay in the ganister mines once they have entered them, or do they go to other mines?—A good workman will stop in a mine; that is to say, a steady married man, but the young men go from one mine to another.

8600. Do the same men also work in coal mines?—We recruit our colliers mostly from the coal mines. There are a lot of coal mines round our works.

8601. Therefore may a man spend some years of his life in a coal mine, and then go to a ganister mine, and *vice versa*?—Yes.

8602. Do you consider that any of your miners suffer from any form of lung disease which is directly attributable to their employment?—I think they are apt, if they do not look after themselves and work in a systematic manner, to get either coal dust or ganister dust.

8603. What do you mean by working in a systematic manner?—There are certain regulations—for instance, after shot-firing they are not supposed to go into the part where the shot was fired for about 20 minutes, until the dust is settled; but if they go in immediately afterwards they are more liable to get the dust.

8604. Do you think that if a man were to strictly observe that and similar rules he would be very little liable to get dust in his lungs?—As regards ganister dust, I think there is very little probability of his getting any at all now, because the drilling is done wet, and the only danger is after the blasting and the dust in the air floating about in coming out of the pit. He is liable to get that more from coal than ganister, because there would be six times as much dust from coal than from ganister.

8605. Do you think that coal dust is a lung irritant to the same degree as ganister dust?—That is for the doctors to say, but I think so. My mine manager says he fears the coal more than the ganister dust at the present time.

8606. Do you think from your experience that phthisis contracted through the work can be distinguished from other forms of phthisis prevalent in the rest of the population?—That, again, is for the doctors to say; but the point is, what you are going to describe the disease if you include it in the third schedule. The miners come to us from other coal mines already diseased, or a great many of them, we say, as in-

stanced by the men who have died after only a short employment with us. These men have coal dust and silicious dust on their lungs, and the point is in the case of dust, whether you can distinguish between dust and ordinary phthisis; and there is also the point, whether you can distinguish the dust accumulating in coal mines from the dust accumulating in our mines. I do not think personally the doctors can tell the difference, because I think there is no difference in the working; the same cause creates the same result.

8607. Do you make a strong point of the difficulty of differentiating between phthisis caused by coal dust and phthisis caused by ganister dust?—Yes.

8608. But if both were included in the Schedule, that difficulty would disappear?—Yes.

8609. Would you have any objection to both being included?—If it is called miners' phthisis I have no objection.

8610. Do you think it would be an unjust thing if employers were required to insure their men and compensate them if it could be clearly shown they suffered serious lung disease due to their employment?—Not if the doctors can be absolutely certain that they can distinguish between phthisis and dust injury either arising from coal or ganister.

8611. If that discrimination is possible and certain, then you think, do you, it is not unfair that they should be compensated?—I think if a man dies from phthisis arising from his industry his relatives are certainly entitled to compensation, just the same as if you kill a man in his work they are entitled to compensation.

8612. In your industry are there many employers of labour?—There are a lot. In our district the materials we make the bricks from is known as ganister. In South Wales it goes by another name, and in other places it goes by the name of silica.

8613. What is it called in South Wales?—It is called dinas rock.

8614. Are the employers in your trade accustomed to insure their men against accident now, as a rule?—Yes. We are insured, and the number of accidents has largely increased since the last Act came into force. I may say that we pay now in insurance about three times the amount we did at the start.

8615. That is a common experience as the Act has become more known, is it not?—Or as malingering has become more prevalent. I have had one or two cases in which as soon as the insurance company has paid the man for nearly twelve months, or as soon as the insurance company has paid the man a settled sum down, the man wanted to be re-employed by me the very next week. They were quite well as soon as they got the compensation money. Those were two cases said to be of spinal injury.

8616. Are there any particular instances of cases of persons suffering from ganister disease, to which you wish to draw the attention of the Committee?—Yes; there is the case of a man named ———. My mine manager told me on the 7th February that ——— had died. I asked what he had died of, and the mine manager said he was supposed to have died of ganister dust, but he had only worked for us a very short time—three months—as a trimmer, and not as a ganister cutter, and for eleven months, after an inter-

val, working in the coal mines as a coal-cutter, not as a ganister miner. The part of the mine where he worked coal only was separately ventilated, and therefore he could not possibly have got any ganister dust from the other ganister workings. He worked for a total altogether of one year and three months. Then where did that man get his disease from if he died of ganister dust on the lungs? I have the death certificate, which I can show you. My manager went and interviewed the man's mother, and she said the doctor had told her that his lungs were completely choked up with ganister.

8617. The point which you wish to impress upon us being that it is very easy to make a mistake in diagnosis?—Very.

8618. (*Professor Allbutt.*) There was no post-mortem examination, I suppose?—No. I wrote to Mr. Walker, the Inspector of Mines, and he told me he thought I had better communicate with the Coroner; but the parents objected, and as I only got his reply on the day of the funeral I did not like to interfere.

8619. The off-hand statement that the lungs were choked with dust was an inference then, at any rate. No one saw the lungs?—No. It shows what a bad name the ganister trade has got, though the damage is caused, not so much by us, as coal-mining, probably.

8620. (*Chairman.*) To what age, do your men work, as a rule, in the mines?—I had one die two years ago 69 years of age. He worked with us as a boy in our clay and coal mines, in which there is ganister as well, at Huddersfield. He came to us at Oughtibridge, where we started our works in 1860.

8621. Was he a miner?—He was a miner at his death and up to the time of his sickness.

8622. As a rule, to what age do they usually work in the ganister mines?—It is difficult to say; varying ages. I have men in my employ of 50 and 60 years of age now.

8623. Do you think they work as long in the ganister mines as they do in the coal mines?—I think a steady man does.

8624. If you had all your ganister miners ranged in a row and your coal miners ranged in a row, would you mark any disparity of age between them?—I do not think so.

8625. With regard to the grinders, do you find phthisis specially prevalent amongst them?—No.

8626. Have you a system of exhaust ventilation?—The grinding is done away from the mine. We have steam jets on the stone-breakers.

8627. Will you explain the process? When the ganister is taken from the mine to the works what happens?—The ganister comes in small trucks to the works, and is put through stone-breakers, which break the stone down to a certain size. There is a certain amount of dust which used to rise some ten years ago in that process, but since the steam jets, or water spray, or even a fan, have been introduced, it has been kept down, so that it blows the dust that would arise down through the breaker, and it drops into a hopper. These hoppers are boarded up to keep the dust confined as it blows down; and it also gets damped from the steam as well. The material is then run from there into solid-bottomed mills—big revolving mills of 10 ft. in diameter. Lime water is run in at the same time, and then it is ground. It is then taken from there and made up by hand brick machines. Formerly, when we had several cases of men dying in the works to contend with, it was largely caused by sanding the bricks in the process of making—we used to sand them with the dry ganister itself: but, during the last five or six years, we have used sawdust instead.

8628. Is the effect of that, that you no longer get cases of phthisis amongst workmen?—We have not had any for a long time.

8629. No cases of any form of phthisis?—We have one or two men we have kept on who were brick-makers or breaker men, who got a certain amount of dust under the old system, and these men were ill; but they are working in the open air, and we find them labouring work about the yard. I have one man—I think the very man Dr. McLaren mentioned in his evidence at Sheffield—who put six days a week in, and he has been working for ten years with the ganister on his lungs. He is a steady fellow, and, I

think, could work another ten years, but if he is put on the schedule he will retire.

8630. And claim to be incapacitated?—Yes. And not only that, but he will die sooner than if he continues his work. I believe the work helps to work the dust away.

8631. So long as he is not working in the dust, of course?—So long as he is not working in the dust. Those men work outside. I have two men who would immediately come on for compensation, and whom I could pass myself, without a doctor's aid, as having got dust, but it was under the old conditions they got it, not the present conditions. I know of no conditions at present where there is any danger.

8632. In all the works in the trade are the same precautions taken?—Yes.

8633. Have you any statistics you would like to present to the Committee with reference to the death-rate from phthisis in the ganister trade and in other trades?—I have other men mentioned in my list. There are —, —, —, and —, all of whom worked a very short period in the mines, and I think all of them came from the coal mines. Suppose one of these men died and the death was certified as pneumonia—tuberculosis—and suppose he had only worked a few months with us, if we are put in the third schedule, could not the relatives, after that man's death, say, "He has some dust on his lungs from working on your place; we want compensation."

8634. It is a question of fact, of course, whether he died through that disease?—But they would say his death had been accelerated through the work, as far as I can see.

8635. Do you think if the dust is merely a cause contributory in a minor degree it ought to be made certain no compensation should be claimed?—I do not know; that is a point of law. I am afraid I shall be held liable for all chest diseases of men who have worked in my works.

8636. And your point is, is it, that you do not think it just compensation should be paid unless it was clear dust was the main cause of the disease?—Just so. The point is, could a relative say, "You have accelerated the death; that man has died a few months sooner than he would have done, and therefore you have to compensate us."

8637. That depends, of course, on the form which the order takes. You have some figures in your proof, have you not, as to the death rate from phthisis in the Bradford district?—I think I will leave that to Dr. Kite, who will deal with it.

8638. (*Professor Allbutt.*) You said that there have been more accidents since the Act came into force. You mean more have been recorded. The men do not court accident, of course, do they?—No. I meant more complaints.

8639. Referring to the spinal cases you mentioned, which are very obscure and difficult, I remember very well indeed, when railway accidents were first brought into court. There was enormous difficulty in deciding as to the nature of that kind of accident, and I daresay you remember, too, that in those days it was almost pell-mell business with regard to compensation, and medical men went into court often with very imperfect agreement both as to facts and inferences. It is quite possible, in the case of any new Act coming into force, there may be such difficulties at first, and that medical men will not have quite settled down to definite opinions; but the Committee have heard a good deal of evidence to suggest that medical men can already, and still better as they become specially expert, distinguish between the form of chronic pulmonary disease due to the inhalation of dust and such a case of primary tuberculous consumption as you mentioned just now?—The further point is: can a medical man, if you are going to put ganister dust on the list and not miners' phthisis, tell the difference between a ganister worker and a worker in the coal-mines round Barnsley? You see, I get men coming to me from the coalmines who are already diseased.

8640. Let us assume that any irritating dust will produce a particular kind of pulmonary disease?—You see my difficulty is, if I have to pay for other people's diseases, I shall not want to take any miners who have any dust on their lungs at all, and the result is that I shall not have any men. My works will be closed down.

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8641. Do you really think that ganister miners are suffering from the obloquy of the coalminers? Do you think the coalminers the worst of the two?—My mine manager says they are.

8642. Do you find any prejudice against ganister mining? Do the men come readily to you?—No; we cannot get them readily. I could employ twenty more to-day.

8643. On account of dust?—No, because it is harder work.

8644. You have never heard any prejudice against it on account of danger to the lungs?—No.

8645. They come from the coalminers readily to you, in so far as health is concerned, do they?—Yes. The great difficulty with the men is the rock which has to be filled up in big lumps of 10 cwt. each, and it is harder work.

8646. (Mr. Cunynghame.) Do I gather that there are three difficulties which you raise? In the first place, you say that coalminers come to you already suffering from phthisis?—I can only conclude so; I do not know.

8647. If you say from returns that the phthisis of coalminers is far less than the phthisis in any other occupation in the country it would prove, would it not, that the coalminers would be the very safest men to take instead of the most dangerous?—We will take the coalfields around Barnsley, which are adjacent to our mines. The death rates around Barnsley that I have had given me are all over 1 per cent.

8648. Would you challenge that assertion of mine, then, that phthisis is less common among coalminers than among other classes of the population?—In comparing the Barnsley district with our district, the Barnsley district is just double, but Dr. Kite will go into that with you gentlemen. I got from the medical officers of health around Barnsley, Monk Bretton, Wombwell, and those districts, their figures.

8649. If you take a coalminer in this return, and take the diseases of respiratory organs, the coalminer stands not so high as many of the others, but when you come to take phthisis do you see the remarkably low figure there is, and that is the fact in every district all over England. In fact, the Registrar General remarks that phthisis is a remarkable infrequent disease amongst miners?—I will take it from you.

8650. If that was so, it would prove you were under an immense advantage in recruiting from miners instead of a disadvantage, and that you were gaining by it, would it not?—That is so; but I have these cases all round me. Dr. Robertshaw stated it took 15 to 25 years to accumulate ganister dust on the lungs, and I agree with him in the case of a steady workman. But here you have cases where they have worked only a very short time for us.

8651. Taking a man who has previously worked in coalmines, and has only worked in ganister mines for a short period, because a doctor says it must take 25 years to develop ganister dust, are we to conclude he must have caught it somewhere else, in spite of these statistics of the Registrar General. Does not the doctor's statement require checking?—But how could a man get ganister dust? The whole of this inquiry is based on Dr. Robertshaw's evidence.

8652. Not at all. It is based partly on the Registrar General's returns. You get remarkable freedom from phthisis among coalminers, and you get a considerable quantity among ganister miners, and you say ganister miners are recruited from coalmines, I understand?—They are.

8653. Then the point is difficult to meet, is it not?—It requires looking into. I think the fact of these men working such a short time for us, and having died, shows they must have caught the disease elsewhere.

8654. Or else your industry must be very dangerous, which is the other conclusion?—Yes. On the other hand, we have men who have been working for us for over 40 years.

8655. The doctors say they can distinguish, given sufficient knowledge of the life history of the whole case, and a right to ask every possible question, phthisis from dust and phthisis from other causes. It is said there would be a temptation for men who are already affected, whether from coal or some other occupation, to become ganister miners in order to get a provision for their old age. So far, that appears a valid argument, but would not that be met on your part by

causing them to be inspected before taking them on. You would have to know their history, would you not?—Yes, and if we dare not take a man from a coalmine if we are put on the schedule, where are we going to recruit our men from?

8656. I am not sure you dare not?—But our past experience is better than anything else.

8657. Have you had men from other places than coalmines?—No.

8658. Then how can you compare?—We have to take miners.

8659. (Professor Albutt.) But those tables are prepared from experience, surely?—We must take the men from other mines, and yet we dare not if we are put in the third schedule.

8660. (Chairman.) Should you expect coalminers would be more subject to phthisis than agriculturists?—Certainly.

8661. These figures show that while the mortality figure of agriculturists is 106, that of coalminers is only 97, and ironstone miners 90, while it runs up in the case of potters to 333, in cutlers to 332, and in tin miners to 508, so the coalminer stands at the bottom of the scale, you see?—There may be some disease in working different kinds of coal depending on the district.

8662. (Professor Albutt.) Does coal working in your neighbourhood involve working ganister as well?—Yes, it is an under clay.

8663. In the coalmines?—Yes.

8664. So that a man is both coalminer and ganister miner as well, is he?—Yes. In all coalmines you have rippers and packers, and those men are subject to dust all along from silicious rock—the under rock, which is ganister.

8665. (Mr. Cunynghame.) Then is it your point that if we examine the statistics for phthisis among coalminers in your district we shall find them much bigger than in other districts in England. Will you rest your argument on that, because you are in this position, that you have to admit that all over England phthisis is small among miners, but now you say, "Yes, but very likely it is very big in my district?"—I say it is not big in my district. I say it is not as big as in the Barnsley district.

8666. Among coalminers?—Among my miners; among the whole population in our district it is not as big as among the whole population in the Barnsley district.

8667. Then there is all the greater argument for thinking that ganister does it?—No; that ganister does not do it. The death-rate from phthisis amongst the whole population of our district is .47 per thousand; in the Barnsley district it is over 1. Out of a population of 8,600 there are 900 ganister workers in that district, and the rate is only .47 per thousand.

8668. But the difficulty is, you ought to prove that there is an abnormal phthisis mortality among the men from whom you recruit. That is your argument, is it not?—That is what I say, from these particulars which we have; the men have the disease before coming to us.

8669. You must admit that ganister mining in old days was a very dangerous occupation, must you not?—In the old days it was.

8670. And that, consequently, there are a large number of men who have the disease in them as the result of working in the old days?—There are a certain number.

8671. In future, do you think there will be very little of the disease amongst them?—I think so.

8672. Then the Act will not do you very much harm, will it?—Yes, it will, because we shall be entirely in the hands of the doctors and the workmen.

8673. So will the men be in the hands of the doctors, will they not?—But our business will be practically managed by the doctors and the workmen. Taking the first symptoms, there is only anæmia and shortness of breath going up hill, but I should like the doctor to talk about that. I would rather leave the death-rates and the medical part of the subject to Dr. Kite, because I have not gone into it myself. I want to tell you the truth, and our opinion is that we get men from the coal mines who are diseased. Whether it is that we get the rolling stones—the young men or not

I do not know—but the steady married men are good, their health is good, and they stay at home, and do not go away, but we evidently get the riff-raff of the miners. I can only put it down to that. These men have never got ganister dust in our mines.

8674. Still, it is difficult to resist the conclusion that some *prima facie* case has been made for putting it into the schedule, is it not?—There is no doubt that in the past there has been more of this disease than there ought to have been. I blame the doctors to a very great extent, in this way: About 90 per cent. of the doctors in the district said it was dynamite fumes that killed the men. We took means to prevent them going into the hole until the dynamite fumes were got out, and no one ever thought of ganister dust, and the result was these cases were all accumulating, until, I think, in 1895 to 1896, the death-rate was enormous; but ever since then the deaths have been coming down gradually. Not only that, but Lowood's and ourselves were the pioneers of the industry. It is only a new industry, thirty years old. We were the pioneers, we were ignorant, and did not know how to protect the workmen from dust. We did our best, but still the men started to die off, before ever we knew the disease was on us. As soon as means have been taken to counteract the disease the death-rate is gradually going down, and it will disappear if you will only give it time. There is no doubt that dust can be prevented, and is being prevented almost entirely now, and if the factory inspector and the mines inspector would co-operate with the employer and the workmen, and meet and thrash the thing out with regard to what means of prevention can be taken, you will never hear of ganister dust.

8675. What district is yours?—Bradfield.

8676. Which county would it be under?—It is in the West Riding, Yorkshire.

8677. There the figure for coal miners' phthisis was 66 ten years ago, and it is less now; it certainly has not increased?—Quite so. You see, the whole of this inquiry has been based on medical evidence produced from Stocksbridge and Oughtibridge. Those are the only places where the disease exists. In the other places the people started later than we did, and have the advantage of our experience, and it is owing to us having been the pioneers of the trade that the bad results have happened.

8678. (Professor Allbutt.) Will you agree with me that until you carried out these exceedingly proper

improvements the physicians of the neighbourhood had no opportunity of forming an experience; they had to work out the problem just as you had—if so, I do not see why they ought to be blamed for not recognising the conditions of the employment?—A post-mortem examination might have satisfied them.

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8679. As these matters are better understood the discrimination will become so decisive, and the rules of diagnosis so clear, you will not be more in the hands of the medical profession, will you, than you are in the hands of any other profession, such as the law, when you seek advice?—But what does the law say with regard to a man dying of tuberculosis or chest complaints having worked at our place for a few months?—Shall not we be held responsible?

8680. (Chairman.) The law does not say anything at present. You are not included at present, and if you are included it may be with modifications?—Quite so.

8681. (Professor Allbutt.) Do you know anything about miners' beat hand?—No.

8682. (Chairman.) Is there anything else you wish to state to the Committee?—I should like to say further that before you decide to do anything with regard to putting us in the 3rd Schedule, I think you would be very wise in taking medical evidence from medical men who are practising near other silica and ganister brick works. They can tell you what the other districts are doing. You see, the whole of this inquiry is based on one district. It is sort of prejudiced, you may say. It is against us because we were the pioneers. It is not taking the view of the whole trade, and the former conditions to-day in my works and in Lowoods are past. I am sure Lowood's and my firm, who are now the only two firms who have workmen with dust on their lungs, would be quite prepared, along with the workpeople, to form a sick club until such time as the men who have already got the dust had been fully looked after.

8683. (Professor Allbutt.) I think we may assist you by saying that the evidence of the injury of ganister dust does not depend entirely on your district, but even if it did, it would come under a very much larger head of chronic pulmonary disease due to the inhalation of dust, more especially of metallic or silicious dust?—I am inclined to think you have two sorts of diseases to contend with in mines and works; in one case you have a mixture on the man's lungs of coal and silica dust, and in the other you have silica only, just the same as in a stonemason's disease.

Mr. HERBERT HINCHLIFFE, called and examined.

8684. (Chairman.) Are you a proprietor of ganister works and of collieries also?—Yes.

8685. And ganister mines?—Yes.

8686. Whereabouts do you carry on your industry?—Near to Penistone, some thirteen miles from Sheffield, or about six miles from Deepcar.

8687. About how many men have you employed in working ganister in your mine?—About 30.

8688. How many men have you employed in the ganister mills?—Round about on the surface I should think we have something like 40 men.

8689. Have you had many cases of phthisis either in the mine or the mill?—I do not remember a single case of what I considered at the time to be phthisis. Of course, I am not a medical man, and I do not understand these terms altogether, but in my experience of over some twenty years I have only noticed two cases of what I considered to be consumption. I do not understand the various forms of disease, but I have brought the medical officer's report of the district as some evidence on the point.

8690. Is it your personal experience that your men do not suffer greatly from lung diseases?—That is so.

8691. Do your workpeople live long in your employment? Do they live to old age?—Yes. We have very good records as to that. We have one man who has actually worked for us over 70 years.

8692. Was he exposed to ganister dust?—In the early part of his life in the mine he was.

8693. Can you tell me how many years' service your workpeople average?—I think they average over 35 years.

8694. That is taking them all, is it?—That is taking them all.

8695. Then for fibroid phthisis, or any disease of that character, no matter what nomenclature you may take, if it were scheduled there would be very few cases in which your firm would have to pay?—I am rather afraid if the workmen got to know the effect of the Act properly the good relationship between the masters and the men, which has obtained during the last 80 years, would cease; that they would commence to malingering and draw their wages, and go out and do light employment. Up to this time we have been particularly careful to look after our workmen. There is no doubt that in this long period we have men who, from some cause or other, may have lung disease, and I fail to see how we could get out of paying compensation, whether it was caused in the industry or not, so that we should have to take a different view of the question to what we have done previously.

8696. If it had to be certified by a certifying surgeon that a man was suffering, say, from fibrosis of the lung, and there is an appeal from him to an expert medical referee, and when it was proved on the authority of these two medical men the man was suffering from this disease, and he then had to prove in court if necessary, that he contracted it in your employment or in the industry, do not you think that would be sufficient safeguard?—I have not gone very closely into the medical point, but it strikes me it is impossible for a medical man to give an opinion as to the cause except by a post-mortem examination. I do not know whether I am correct, but in a case where a man wished to malingering you could not very well make a post-mortem examina-

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tion of him to decide the question. I fail to see danger really in the industry, and to my mind this matter has arisen in consequence of two firms only. I am only six or seven miles away from them, and the only thing I want is a due inquiry with regard to the rest of the firms. I have not been consulted in the inquiry with which Mr. Robertshaw has been connected; in fact, I have never thoroughly understood it. I do not believe I have ever read it, because it did not concern my district, and when the matter was on I was not aware of it. I only casually came across Mr. Brooke, who explained the situation to me, and I am anxious, before you take any steps, that you should make inquiries into our district and other districts in which ganister is worked.

8697. (*Professor Allbutt.*) Do you mean you would send your own medical men to give evidence?—Yes, I should like you to see Dr. Wilson, the medical officer of health for my district, who writes to me: "Although I have lived in Penistone 31 years, and have attended nearly all the men who are engaged in the ganister works, I cannot call to mind a single case of phthisis which I should say had been caused by that industry. I have also been medical officer of health for Thurlestone for about 25 years, but I have never had occasion to make any reference to lung disease being prevalent among workers at the ganister works."

8698. How do you think a man could malingering chronic pulmonary disease, which was said, in the opinion of a medical man, to be due to dust?—Take an old miner—and I have one man in my mind now who has worked for my family over 50 years—I walked home with that man from his work last Friday afternoon. He is something like 60 years of age, and he breathes very shortly, and cannot walk very fast, but he can do his day's work quite easily. He is not capable of getting along the road like he could when he was a young man, and I can quite recognise that that man may have some dust, coal dust or ganister dust, or anything else, on the lungs, but I say old age to a very large extent has brought him to the state he is in, though he might make a claim for compensation, and I could not say, and I fail to see, how a medical man could diagnose the cause of his complaint entirely.

8699. Your point is not so much that he could malingering the disease, but that he could malingering the degree of incapacity for work; because you yourself admit that this shortness of breath is due to his employment?—I do not.

8700. I understand that incapacity may be malingering; that is really your point, is it not?—Yes. I think the man can get compensation by malingering.

8701. But in that case he must have the disease at any rate in some degree. He must have that condition of chest which can be ascertained by medical examination, though how far it incapacitates him may perhaps be a matter of doubt. Do not you think it would be better to put it that the uncertainty lies rather in the degree of incapacity than in the nature of the disease? I am not very well versed in the medical aspect of this matter, but I think without post-mortem examination you could not properly or satisfactorily diagnose the cause of the complaint.

8702. That is very true as a general principle, but we are speaking of men who are not dead. You probably would agree with me, would you not, that a sufficient number of post-mortems in such cases must have been made on which to found an opinion?—Yes.

8703. When sufficient post-mortems have been made, surely upon that may be based a very good opinion as to the state of those who are living?—No doubt you can deduce from those examinations, but my strong point is to go further into the matter, and investigate it more widely before taking action. I think the matter has been conducted in too narrow a compass for the trade properly to become aware of it.

8704. You scarcely know, do you, how widely we have gone into the matter, but in so far as you suggest that in your particular district we might have more information, and you will tender to us medical evidence in addition to what we have had already, we shall be glad to hear it?—Thank you.

8705. (*Dr. Legge.*) You said you had about 30 workers, and that the average duration of employment had been 35 years?—Yes.

8706. I am bound to say the figures one has dealing with a district six miles from you do not bear out your views. Do you think there would be anything abnormal in the conditions of work if in this list of 69 ganister miners' deaths, which I have, the average age of the whole 69 from diseases of the lungs was 38?—I should say it was abnormal.

8707. Those are all the deaths occurring within the years 1891 to 1900 in the district of Deepcar and Oughtibridge?—I think I can give a reason for it. In that particular district they have developed their concerns very quickly, and the result has been that they have had to draw labour from wherever they could get it. Quite the opposite applies in our district, where the thing has gone on in its usual course for a number of years, and we have been able to choose our men. We have got what we consider good, quiet working men, but when you take a stranger, you take him at a risk. It is very usual for the riff-raff of society in the working-class population to walk about. We have applications, perhaps, half a dozen times a week, for employment, but we never give work to a stranger if we can avoid it. In the Stocksbridge Valley they have never been able to get sufficient labour, and they have set everyone on, and I think they have taken great risks in doing so.

8708. Have your works been established as long as these other works?—Our works, as a firm, have been established longer, but not in the ganister industry.

8709. I find in the list here only two out of sixty-nine are over 50 years of age, one 62, and the other 54, every one of the others being under 50 years of age, so that they ought not to be broken down at that age from ordinary causes, apart from conditions due to their work, ought they?—If you take the ordinary type of man going about the country seeking work, I think he is broken down to start with. He has not taken care of himself; he may be a drunkard or something else; he has not looked after himself, and is a very risky man to engage.

8710. (*Professor Allbutt.*) Did you hear the evidence given by the previous witness?—Yes.

8711. Have you the same wet process in use as he described?—Yes, under the Coal Mines Regulation Act.

8712. (*Dr. Legge.*) But only within the last two years?—Yes, about two years ago. Of course, the mines inspector required all the firms to adopt this regulation, and although I believe we proved to him that in some cases it was not necessary in wet mines to wet the drill hole or the ganister previous to breaking it up, still, the thing is done as well as possible all the way through.

8713. (*Professor Allbutt.*) Then in your opinion, has the change been beneficial?—I think under our special conditions there has been no improvement, because it was not necessary to start with.

8714. Because it was a wet mine?—Yes, but it was such a little matter to do that we have never grumbled at it.

8715. (*Dr. Legge.*) Is the whole of your mine wet?—It varies. As a rule it is; it varies from a wet to a damp mine.

8716. Might not that account for the fact that the men have not had to encounter the same amount of dust in your mine as they have in the mines six miles off?—I do not like to give an opinion, because I am not conversant with their working conditions, but I take it it is largely that they have not been sufficiently discreet in choosing their labour, and that circumstances have caused them to take anyone on.

8717. (*Mr. Cunynghame.*) What district are you speaking of with regard to the West Riding of Yorkshire?—The southern division of the West Riding.

8718. How many works are there that you know of in that district?—We have four within a radius of some mile and a-half.

8719. And more beyond that?—Yes, right away up through West Yorkshire.

8720. How many do you know of personally along that district, roughly?—Right away up to Leeds, I should say there are a score, practically, although I do not know them personally.

8721. How many of those works use jets of water in the mills?—All of them, or the whole lot should in the ordinary manufacture.

8722. You believe they are all using the water pro-

cess now, do you?—I do, and I think they always did. I think the water process in the mills is necessary for the manufacture of the goods.

8723. Was not it customary not so long ago to break up the stuff with sledge hammers?—That is the stone breakers. You see, we have a grinding mill, where we grind into mortar, and we have the stone-breaker. I am afraid I did not understand your question.

8724. Some of the breakers use water, do they not?—I believe they are all obliged to have it.

8725. Since when?—I take it, two years ago.

8726. And a great improvement has resulted, I presume?—There is no doubt if you can lay the dust it is an improvement.

8727. If a great improvement has followed from the use of water, does not it show that carelessly managed works may be dangerous?—I take it that dust is acknowledged to be a serious matter in any state.

8728. Ganister dust or dust in general?—Dust in general. I do not think ganister dust is a good thing, and if you can allay it, by all means do so.

8729. It is about the most dangerous dust there is, is it not?—I am not prepared to say that, because my experience points out that our men have lived long, happy lives in the industry.

8730. Would you name any dust which you consider more dangerous than ganister dust?—The grit stone which the mason chisels away without wetting the stone, is to my mind, considerably more dangerous and the conditions are more dangerous, than our men work under.

8731. I was rather referring to the quality of the dust?—I think a very sharp grit is about as bad a thing as you can have.

8732. They are pretty much on a par, are they not?—I do not think there is anything to choose between them.

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Mr. ALFRED HENRY RUEGG, K.C., called, and examined.

8733. (Chairman.) Do you attend here at the request of the ganister mine owners, whom the Committee have just examined?—I represent the owners engaged in the ganister industry.

8734. Have you heard the evidence given by Mr. Brooke and Mr. Hinchliffe?—Yes.

8735. Are there any points with regard to which you would like to supplement that evidence?—I think myself that there would be many difficulties in practice in including such a trade as the ganister trade within the third schedule of the Workmen's Compensation Act. It seems to me that it is an industry in which there are great difficulties, in the diagnosis of the disease in its various stages, both in the initial stage and in what may be called the advanced stage, and some difficulties in case of death. I think myself, speaking from my considerable experience of the way in which workmen's compensation cases have been in the past fought in the courts, that there would be very great liability in an industry of this kind of malingering, and often a liability put upon the mine owners in case of death where the disease was not really the cause of death, but was only an inducing cause—what we call in law a *causa sine qua non*—and where it could not be said to be the real and effective cause of death. It would be perfectly easy for medical men to say, and they would say, "I think in this particular case death would not have resulted, at this time, at all events, but for the industry in which the man was engaged"; and as I view the law, unless special safeguards are put into the Act against that, there will be serious liability; because in law, if you hasten a man's death, you cause it.

8736. Does not the same difficulty arise in the case of accidents which are followed by prolonged illness?—Sometimes; and there, in some cases, I think very considerable injustice is done to the person who is made liable. One has heard of cases where quite a small accident, neglected by the patient, has resulted in blood poisoning and death, and the person who is responsible for the original accident has been held liable for the death. Those are cases in which I think considerable injustice is worked. But I apprehend this trade would be much more liable to such cases, if what is called "ganister disease" were brought within the Act.

8737. Are you aware that in Clause 8 of the Workmen's Compensation Act of last year a special machinery is established for the investigation of such cases, and that the certifying surgeon is brought in with an appeal to a specially appointed referee?—The factory surgeon is the person, in the first instance, to say whether there has been incapacity, or whether the death has been occasioned by the disease. I do not know that he necessarily has any special experience in diseases of this kind; he is often an ordinary practitioner in the neighbourhood. Then, as I understand, the appeal is to the medical referee of the district?

8738. No, not necessarily of the district, but a medical referee appointed according to regulations to be made by the Secretary of State?—That is true; but if it is to be a medical referee of the district, I think I may say, from my own experience, he is an ordinary medical practitioner in the district, and a man with no special experience, or special eminence in the profession.

8739. Supposing various lung diseases were scheduled under this Act, and half a dozen medical men were appointed in different parts of the country who were acknowledged experts in these diseases, with long and wide experience of them, there would be less danger, would there not, of false diagnosis?—Undoubtedly, and unquestionably that would be a great advantage; in fact, I do not think the matter could be dealt with in any other way.

8740. You will have noticed, no doubt, that Section 8 of the Workmen's Compensation Act, the section which authorises the Secretary of State to add further diseases to schedule 3, authorises the provisions of this section to be extended to those diseases with or without modifications?—Yes.

8741. Has your experience led you to think of any particular modifications which you think would be desirable in applying it to such a disease as fibroid phthisis among ganister miners?—I cannot say that my experience has. I have had many suggestions made to me as to what modifications should be introduced.

8742. Will you tell the Committee what they are?—One modification which has been strongly suggested to me and plausible reasons given for it is, that if these miners are to be included they should not be included as from the present time, but that some time should be allowed before the order comes into force.

8743. On what ground was that suggestion made?—One ground is, that the industry has already made a large number of contracts at fixed prices, and that the insurance premiums would be very large. But that is a small matter perhaps. It seems to me, however, that it would be necessary for any insurance company insuring such an industry as this, to take most careful measures and to find out by statistics what the risk is likely to be before quoting any premium at all; that of itself must take some considerable time. Then it is suggested that to bring in ganister disease alone, which, after all, is only a small industry in which there are injurious effects from silicious dust, would be somewhat unfair, and that if it is brought in it ought to be brought in as part of a much more general scheme, viz., one including all kinds of disease due to dust.

8744. That is a question of the extent of the additions to the schedule rather than the modifications of the provisions of the section to be applied to these diseases, is it not?—Yes, that is quite true. Then I certainly think it would be necessary, if they are to be brought in, that some very careful modification should be added to the effect that the disease was to be the real and effective cause of the death or the incapacity. I think it would be very risky to leave it to the law to decide whether the disease had caused the death; because, as I understand the law, if it hastened it, if it was a *causa sine qua non*, and if without the effects of the industry the man would have lived a few months or a few days longer, it is deemed to have caused it. Therefore, if the intention is that the employer is to be liable where the disease is the effective cause of death, I think that ought to be pointed out very plainly indeed.

8745. The Act provides that compensation should

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be paid where the death of a workman is caused by disease?—That word “caused” has created great difficulty.

8746. Do you think it would be clearer if the Act were to say, “mainly caused”; do you think that would give rise to as much discussion as the simple word “caused”?—I think it would.

8747. (*Professor Allbutt.*) Would the word “immediate” meet the difficulty, do you think?—That would be a strong word. I see Mr. Cunynghame has said during the proceedings: “There is only one way of doing this, that is, excluding phthisis not necessarily produced by the ganister.”

8748. Have you any other modifications to suggest?—I do not think any more occur to me at the present time.

8749. (*Mr. Cunynghame.*) It has been suggested to the Committee, and I think the owners themselves said so, that this would cause a certain number of men to be removed from their employment. Have you any remarks to make upon that head?—Yes. Of course I do not know anything with regard to this particular industry, but I took a very great interest, and some part, in the evidence which was given before the Committee which sat upon the Workmen's Compensation Act. There was a lot of evidence given as to the effect that Act would have upon old men, simply because of their greater liability to accidents, because they were not so agile as younger men, and it was said they would be, indeed had been in the past, largely dismissed. Such a strong effect had that evidence upon the Committee that they recommended special rules with regard to aged men, which were wisely, or unwisely, struck out in Parliament.

8750. Is there any evidence that those fears were justified?—I think there was a great deal of evidence.

8751. As a fact?—Yes, as a fact in consequence of the operation of the Workmen's Compensation Act of 1897. I feel sure there was very strong evidence given before the Committee that old men could not get employment, and some evidence was, I think, given on behalf of these men expressing their own wish that they might be allowed, if not to contract out of the Act, to contract out of it to a limited extent, to take less compensation if they were allowed to work after 60 years of age.

8752. Are you prepared with any practical suggestion for the consideration of the Committee which could be put before men and employers, to see what they would say to it?—In what sense?

8753. Any suggestion as to the way in which the older men should be treated? I have thought of all sorts of ways, but none of them are quite satisfactory. For instance that, with respect to men who have been in the industry a certain time, the Act should not come into force for a certain number of years, or possibly such men should be given the power of election as to whether they would come under the Act or not?—All such suggestions, I agree, are open to objection, but I think myself the least objectionable course was the course which the Committee which sat on the Workmen's Compensation Act recommended, namely, that in certain cases the men might make a contract (not contracting themselves out of the whole of the benefits of the Act) to get partial benefits under the Act.

8754. (*Chairman.*) Do you think that ought to apply to the case of diseases?—I think it would be a very reasonable and fair thing. I do not know whether it is within the powers of the Home Secretary to so alter the Act.

8755. (*Mr. Cunynghame.*) Speaking as a lawyer, would you call it a possible modification of the section? Do you read the word modification in a wide sense, as giving considerable power to the Home Secretary?—Yes, I think so. The words are: “Either with or without modification, or subject to such modifications as may be contained in the Order.” I think there may be some doubt, but I think it includes modifications of the Act itself.

8756. (*Chairman.*) Supposing the Home Secretary were to make an order to the effect that in cases of industrial diseases compensation should be twice as much as is provided in a case of accident—that would not be a modification, would it?—No, that would be an extension.

8757. If the Home Secretary made an order that the compensation should be half as much, do you think that would be a modification?—I think so; it is arguable either way, but I think it would be. May I point out that the power of the Home Secretary under this Section seems to be very large.

8758. (*Mr. Cunynghame.*) Looking at the figures given in the Registrar-General's returns of deaths, and assuming that the incapacities would be in some measure proportionate, the risk does not appear to be so enormous in the ganister cases as ought to make the insurance very heavy, does it? In regard to tin men the risks are very heavy. In accident cases the risk of coal miners as compared with occupied males in general is 428 to 100; that is to say, $4\frac{1}{4}$ times as heavy?—Of course, coal mining is a very dangerous industry as far as accidents are concerned.

8759. When you come to phthisis, the risk is small in the coal industry. If the ganister industry is something like that, this would not be such a very large addition after all, would it, if the ratios are as the returns seem to show? I rather invite proof from an insurance company that they would want large sums?—I think the insurance companies in all these cases have to look not only at past statistics, but what they think will happen when the Act is in operation, in the shape of expecting far more claims, some of which they would successfully resist, but the vast majority of which they could not successfully resist.

8760. Could your doctors give suggestions, if the thing is to be scheduled, as to the terms in which the disease is to be described?—Yes, but it seems to me, if I may venture to say so, that this ganister disease has got a bad name in consequence of the evidence which was given by Dr. Robertshaw. It does not appear to have been considered as a disease distinct from dust poisoning until Dr. Robertshaw called attention to it. Turning to Quain's Dictionary of Medicine, it is described as a distinct disease. No doubt it is only colloquial, but still it has its separate heading, and a terrible picture is drawn of it. Quain says the miners develop a hacking cough, and in four or five years' time they die, and gives a very high death rate. But the authorities for the statements are Dr. Robertshaw and Dr. Birmingham (who I believe derived his statistics and facts from Dr. Robertshaw). Dr. Robertshaw spoke, no doubt, as to one particular district in which there were existing works which were not properly managed at that time. May I say that it does seem to me from the evidence given that as the whole injury arises from dust, and as there is no process in this trade in which it is necessary to treat the product in a dry state, if you remove the danger you remove the necessity of putting the industry into the third schedule.

8761. (*Professor Allbutt.*) We are now speaking on the nomenclature of the disease, and not on the business which may be included in the second column of the schedule. I do not quite understand what you mean by saying “really” or “essentially,” and you gave an example which I was even less able to comprehend. I suppose your point is as to the degree in which dust enters into the cause of death or incapacity?—Yes.

8762. And I suppose when you say it is, or not, “really,” the cause, you mean that there may have been some inter-current event?—Yes.

8763. Yet I suppose you would not deny that, however remote it may be, if the disease be a continuous process the death would be attributable to the original initiation of the disease?—In law, yes.

8764. And in pathology also?—I suppose that would be so.

8765. Supposing, for instance, a man to have dust disease of the lungs, and to be on the eve of incapacitation, and then to break his leg, you have an inter-current event, and his immediate incapacitation is not caused by the disease?—May I follow that? Supposing he breaks his leg, which leads to the general lowering of his health; that, combined with the ganister lungs, if I may call it so, renders him much more liable to be attacked by what may be called the tubercle bacillus, and he is attacked by the tubercle bacillus partly owing to the condition of his lung and partly owing to the lowering

of the health by the accident, and death results from tubercular consumption, in a sense the death is caused by the condition of the lungs.

8766. But taking your example of a man having a wound, which goes on to blood poisoning, that would be a continuous change of events, would it not?—But it may be brought about by improper care on the part of the patient himself.

8767. Well, supposing a man falls down and cuts his hand and dies of lockjaw, the lockjaw is not an inter-current event?—I am quite sure if this disease is put without qualification into the schedule

the ordinary course when the cases come into court will be this: The doctor will be asked "Had this man some ganister on the lung? (A.) Yes. (Q.) Do you think that, at all events, accelerated his death; would he have died on the particular day if he had not worked five or ten years subject to ganister dust?" and if the doctor says, as he would be obliged to, "I think he may probably have lived a little longer, although he had the seeds of consumption in him, but for having been engaged in the industry," if this industry is put into the schedule without modification, in my opinion the employer would be liable in every such case.

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MR. EDWIN W. D. KITE, M.B., M.R.C.S., L.S.A., called and examined.

8768. (Chairman.) Are you a medical man in practice in Hillsborough, near Sheffield?—I am. I am now actually within the Borough boundary of Sheffield now.

8769. Are you Medical Officer of Health for the District of Wortley Union?—I have been Medical Officer of Health, but at the present time I am Medical Officer for the Union.

8770. Are you also Factory Surgeon?—I am Factory Surgeon for the Owlerton District of Sheffield, which includes the ganister area.

8771. Are you of opinion that ganister disease is much less prevalent than it used to be?—Yes. I am decidedly of opinion that it is very much less than it was when I first came to Sheffield 18 or 20 years ago.

8772. But cases do occasionally occur?—Very rarely indeed. In the last few years I have only had one case, and that was the latter end of last year, but I have lost sight of the patient entirely.

8773. Has your practice altered at all?—No, except that it has increased; it is among exactly the same class of people. I commenced practice by myself, but now there are four doctors practising in my firm.

8774-5. Are you of opinion that it is easy, or that it is possible, to determine whether in any individual case a man was suffering from phthisis due to dust, or from tubercular consumption, or some other lung disease?—I should say in the earlier stages it is practically impossible.

8776. By "earlier stages" do you mean stages in which a man is not incapacitated from work?—Yes.

8777. But when he becomes incapacitated from work would it be possible?—I should not undertake a differential diagnosis with any very great confidence.

8778. But do you sometimes come across very clear cases in which you can say: "This man is suffering from fibrosis"?—I have not come across a clear case for some years. In the case I referred to, the man has a tubercular history, and the only way I could possibly put him down as having ganister phthisis was because he happened to work in a ganister mine, and he was a young man. I did not take any particular notice of the case, but from the idea I had in my mind that man had a tubercular history, and it was tubercular rather than ganister.

8779. Are you of opinion that coal dust is a lung irritant to the same extent as ganister?—I should say that it is very difficult to tell the difference between the two. I may say that some years ago I was living in the South Staffordshire coal mining district, and had some little experience of it, and comparing the symptoms of coal miners' disease with the symptoms of ganister disease in my district, I

should say the difference is so small as practically not to be noticeable. If anything, ganister symptoms in my district, at any rate, are practically nil.

8780. Are you surgeon to a club in Wadsley which consists of miners?—I am surgeon to a club at Wadsley which is called the Miners' Club.

8781. Does it consist mainly of miners?—It consists mainly of miners.

8782. Are they ganister miners or coal miners?—They are both. A man might be a ganister miner at one time, and a coal miner at another.

8783. In this club do you find members suffering from phthisis?—I have not seen a single case.

8784. Have you had any in recent years?—I have not in recent years.

8785. (Mr. Cunynghame.) You act for the Prudential Assurance Company, do you not?—My firm do.

8786. Have they taken any particular notice of this ganister disease?—They have not. They do an immense business in that way, and have never taken any particular notice.

8787. That is a two-edged argument, is it not, because if they have not taken much notice of it, it does not follow that in the future they would increase their premiums?—I could not say as to that. The Prudential is an old-established company in the district, and have a very big business, as we know by the amount of work we do. The miners in our part insure for small amounts of £25 to £50 and £100, and they have never put any restrictions in our way, neither have they increased the premiums in any way in regard to ganister miners compared with men of the farmer class, of whom there are many in my district.

8788. (Professor Allbutt.) Your experience of dust disease of the lung is so small as to be almost insignificant, I take it?—Yes, and I should say it is proved also by the statistics and by the returns of the medical officers of health.

8789. Then you do not rely very much upon your opinion, I take it, that a differential diagnosis is impossible by those who have seen a good deal of dust diseases?—There are so few in our district, and we have a great many ganister workers there.

8790. You are not in a position to say that persons who are in other districts, and who have seen a great deal of dust diseases of the lungs, would not be able to form an opinion, are you?—All I can say is, we practice in a district where there are a great many of these ganister grinders, and the medical officer of health for the district only reported one case last year for 1905.

MR. ALFRED GREENWOOD, called and examined.

8791. (Chairman.) Are you Secretary of the Glass Bottle Makers of Yorkshire United Trade Protection Society?—Yes.

8792. And corresponding National Secretary of the Glass Makers' Societies of the United Kingdom?—Yes.

8793. Are you able to tell the Committee something about diseases of the eye from which bottle makers suffer?—Yes, I think so.

8794. Are you of opinion that bottle makers do suffer from any special affections of the eye due to their trade?—I think so.

8795. To what do you attribute that?—To the heat and glare from the furnace and the continuous sweating.

8796. Have you any statistics you can give the Committee showing the extent to which glass bottle workers suffer from cataract and other eye diseases?—Yes, I have a schedule, which I have supplied to your Secretary, showing the number of workmen who have been superannuated during the last nine years, and the causes from which they have become disabled from employment.

8797. Are those members of your union?—Those are members of our union.

8798. Is there any limit of age up to which superannuation benefit can be given?—Yes, 50 years of age, and it has been as low as 45 years of age.

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8799. When was the age raised?—In December, 1905.

8800. Then any cases of cataract of a lower age than 45 would not appear in this table?—That is so.

8801. How many workmen have you in your union from among whom these cases are selected?—About 2,360.

8802. How many of those would be over 45 years of age, should you think?—All those would be 45 years of age when they began to receive superannuation allowance.

8803. But it is not every member who receives superannuation, I suppose?—No, only those who become permanently incapacitated.

8804. How many members have you over 45 years of age, and who, if they became incapacitated, could claim benefit?—I could not answer that question now.

8805. It would be a few hundreds, I suppose?—Yes, it would. It is only recently that we have given

attention to this matter, with a view of ascertaining what was the condition of the glass bottle hands. It happens that nine years ago the Society appointed a medical man to examine the members who applied for superannuation benefit, except in a few instances where workmen were distant from Yorkshire—for instance, we have a few men who work at Blaydon, a few working at Newport, Monmouthshire, and a few in London here, and on some of them making application for superannuation benefit they have been examined by medical men in the locality, but several of them have come to Castleford to be examined by our own doctor, and this table has been prepared from his certificates.

8806. The summary table in your proof, which is the most important, shows that you had 114 cases in those nine years who came on your superannuation fund, does it not?—That is so.

The Table was handed in, and is as follows:—

Analysis, showing the various diseases of glass bottle makers, blowers, and gatherers, for which work was given up, 1898-1906:—

PREPARED BY DR. G. B. HILLMAN, CASTLEFORD.

| Diseases. | Makers. | Blowers. | Gatherers. | Total. |
|---------------------------------------|---------|----------|------------|--------|
| Defective eyesight - | 4 | 3 | 1 | 8 |
| Cataract - | 26 | 4 | 3 | 33 |
| Ulcer of cornea - | — | 1 | — | 1 |
| Opacity of lenses - | 2 | — | 1 | 3 |
| Optic neuritis - | 2 | — | — | 2 |
| Glaucoma - | 1 | — | — | 1 |
| Bronchitis - | 2 | — | 1 | 3 |
| Emphysema - | 5 | 2 | — | 7 |
| Phthisis - | 1 | 2 | 1 | 4 |
| Heart diseases - | 8 | 7 | 1 | 16 |
| Kidney diseases - | 7 | 2 | — | 9 |
| Diseases of blood vessels - | 7 | 1 | — | 8 |
| Nervous diseases - | 4 | 3 | — | 7 |
| Other diseases - | 10 | 2 | — | 12 |
| Total - | 79 | 27 | 8 | 114 |

The list handed to me by Mr. Greenwood referred to 114 men engaged in various branches of the glass bottle making industry, viz.:—

| | | | | |
|---------------|-----|-----|-----|-----|
| Bottle makers | ... | ... | ... | 79 |
| Blowers | ... | ... | ... | 27 |
| Gatherers | ... | ... | ... | 8 |
| Total | ... | ... | ... | 114 |

From examination of this list, I find that 48 of those men ceased work owing to the various diseases of the eyes or defects of vision. Of these 48 men—

35 were bottle makers.
8 were blowers.
5 were gatherers.

The diseases which incapacitated these men were the following:—

| | | | | |
|--------------------|-----|-----|-----|-----------|
| Cataract | ... | ... | ... | 33 cases. |
| Defective eyesight | ... | ... | ... | 8 " |
| Opacity of lenses | ... | ... | ... | 3 " |
| Optic neuritis... | ... | ... | ... | 2 " |
| Glaucoma | ... | ... | ... | 1 case. |
| Ulcer of cornea | ... | ... | ... | 1 " |
| Total | ... | ... | ... | 48 cases. |

Of the above 36 cases of cataract and opacity of lenses—

28 occurred in bottle makers.
4 " " blowers.
4 " " gatherers.

From the above it will be seen that out of the 114 cases, 42.1 per cent. ceased work owing to various eye troubles, and 31.5 per cent. ceased work on account of cataract.

8807. And out of the total of 114 cases shown in the table were there 33 cases of cataract?—Yes.

8808. And 15 cases of other affections of the eyes?—Yes.

8809. Were the causes stated here the actual causes of their incapacity?—Yes. The summary which our doctor prepared in analysing the returns shows 33 cases of cataract, 8 of defective eyesight, 3 of opacity of lenses, 2 of optic neuritis, 1 glaucoma, and 1 of ulcer of cornea.

8810. But there are one or two cases in which a man had cataract, but in which he might have been incapacitated from some other cause, were there not? For instance, I see one case of phthisis of the left lung and cataract of the right eye?—Yes, that is so.

8811. He might have been incapacitated from the

phthisis and not from the cataract, might he not?—Yes.

8812. Then there is another case, No. 49, of a man who had gout and commencing double cataract, and another of a man who had chronic rheumatism and cataract of the left eye?—Yes, but they gave up working on account of cataract, because they could not see to do their work. I knew these men personally.

8813. Do you think we may take it that in all the cases of cataract in the table, the cataract was the cause of the incapacity?—Yes, I wish that to be understood.

8814. The total number of members of your society is 2,623?—Yes.

8815. The number of men employed in 1906 was 1,122?—Yes.

8816. What happened to the other half of the men?—They are unemployed. Some of them have left the trade to follow other callings, chiefly because there was no employment at the trade, and they are honorary members, entitled to funeral benefit in case of death. Then there are the superannuated members. A large portion of men are unemployed, depending on the trade for casual work and regular employment when it can be had. Dr. Hillman kindly undertook to analyse the schedule, which I have marked No. 1, in order to classify the cases, and consequently I supplied a report, which you have there tabulated, and also Dr. Robinson, of Sunderland, was supplied with data.

8817. Has Dr. Robinson, of Sunderland, examined all these cases?—No, but Dr. Hillman has examined all these men except a few.

8818. Are you of opinion that there are many men in your society who are suffering from cataract or other diseases of the eye and incapacitated from work, but who are not receiving superannuation benefit, as they are not yet old enough?—Yes, there are such.

8819. There are several such men below the age of 50, are there?—Yes, I am quite certain about it; and I know some, personally, who suffered from cataract perhaps for 10 years before receiving superannuation.

8820. Were they still at work?—Yes. The others worked as long as they could.

8821. Did they work until they could come upon the superannuation fund?—Yes, they worked as long as they could; they worked until they were unable to see to do their work properly, and were obliged to retire

because they could not do it. I have known them personally and have sent them to the Leeds Infirmary to undergo treatment. Dr. Robinson kindly prepared an analysis which I should like to put in. There was a difference of a unit of 1 between his table and Dr. Hillman's, which was accounted for by reason of classifying the workmen at the occupations, but in other respects I believe their reports agree. I have brought them for the information of the Committee.

8822. On what information is Dr. Robinson's table based?—It is based on the returns which I have supplied him. Dr. Hillman supplies me with the medical certificates, which are specified in the table, giving 114 cases. I supplied Dr. Robinson with that list, and he prepared an analysis from the list.

8823. Has the table been prepared specially for the use of this Committee?—No, it has been prepared for general information to the workmen.

8824. Do you publish it every year?—No, but I have interested myself in the question, and have been collecting the data for publication for the workmen's use. I have been interested in the subject for years, and have advised the workmen to wear spectacles at work.

8825. (*Professor Allbutt.*) What kind of spectacles?—What one would call goggles.

8826. Do you mean coloured spectacles?—Yes. Dr. Robinson published a paper, of which I heard, and obtained a copy of it. I had been advising the workmen to wear glasses, and had obtained glasses for their use on trial from Reynolds and Branson, of Leeds. Sometimes I have had 2 dozen pair on loan, and got the men to use and try them. I prepared these data in order to show what the position was of the glass bottle hands, apart altogether from this Committee, of which I did not hear until a few days ago. I explain in my notes that if I had had time I could have prepared a full *précis*. I have another table showing 85 cases of workmen having become superannuated, but under the previous rule of 1891 to 1897. At that time the workmen obtained three medical certificates on applying for superannuation from local doctors. The practice did not seem to give satisfaction, because we found, or had reason to believe—in fact, we know in several instances—one doctor copied from another's certificate, so we changed the mode of procedure and had one doctor. I have not given the names of the diseases in that table, because we had not time to prepare it thoroughly.

The Table was handed in and is as follows:—

NUMBER of GLASS BOTTLE HANDS in the YORKSHIRE SOCIETY INCAPACITATED from following their TRADE during the years 1891-7.

| No. | Branch. | Date. | Age. | Cataract. | Defective Sight. | Various Causes. |
|-----|--------------------------|------------------------------|------|-----------|------------------|-----------------|
| 1 | Castleford - - - - - | March 18, 1891 - - - - - | 56 | — | 1 | — |
| 2 | do. - - - - - | September 26, 1891 - - - - - | 61 | — | 1 | — |
| 3 | Knottingley - - - - - | October 3, 1891 - - - - - | 64 | No | Certificate. | |
| 4 | do. - - - - - | October 17, 1891 - - - - - | 69 | — | 1 | — |
| 5 | Castleford - - - - - | October 17, 1891 - - - - - | 51 | — | 1 | — |
| 6 | Blaydon - - - - - | December 1, 1891 - - - - - | 57 | No | Certificate. | |
| 7 | Castleford - - - - - | January 20, 1892 - - - - - | — | — | 1 | — |
| 8 | do. - - - - - | January 24, 1892 - - - - - | 56 | — | — | I |
| 9 | Knottingley - - - - - | April 18, 1892 - - - - - | 53 | No | Certificate. | |
| 10 | Castleford - - - - - | April 25, 1892 - - - - - | 58 | — | — | I |
| 11 | Hunslet - - - - - | June 22, 1892 - - - - - | 63 | — | 1 | — |
| 12 | Thornhill Lees - - - - - | August 13, 1892 - - - - - | 57 | No | Certificate. | |
| 13 | Masbro' - - - - - | August 17, 1892 - - - - - | 57 | — | 1 | — |
| 14 | Castleford - - - - - | August 27, 1892 - - - - - | 54 | No | Certificate. | |
| 15 | Barnsley - - - - - | September 3, 1892 - - - - - | 56 | No | Certificate. | |
| 16 | Castleford - - - - - | September 18, 1892 - - - - - | 67 | — | 1 | — |

Mr. A.
Greenwood,
5 Mar. 1907.

Mr. A.
Greenwood.
5 Mar. 1907.

| No. | Branch. | Date. | Age. | Cataract. | Defective Sight. | Various Causes. |
|-----|---------------------------|------------------------------|------|-----------|------------------|-----------------|
| 17 | Castleford - - - - - | October 1, 1892 - - - - - | 56 | No | Certificate. | |
| 18 | Hunslet - - - - - | October 31, 1892 - - - - - | 52 | | do. | |
| 19 | Wakefield - - - - - | November 2, 1892 - - - - - | 52 | — | 1 | — |
| 20 | Castleford - - - - - | November 28, 1892 - - - - - | 60 | — | 1 | — |
| 21 | do. - - - - - | do. - - - - - | — | 1 | — | — |
| 22 | Hunslet - - - - - | December 19, 1892 - - - - - | 51 | No | Certificate. | |
| 23 | Thornhill Lees - - - - - | January 14, 1893 - - - - - | 56 | 1 | — | — |
| 24 | do. - - - - - | February 14, 1893 - - - - - | 46 | No | Certificate. | |
| 25 | do. - - - - - | March 6, 1893 - - - - - | — | — | — | 1 |
| 26 | Castleford - - - - - | May 8, 1893 - - - - - | 58 | No | Certificate. | |
| 27 | Knottingley - - - - - | April 4th, 1893 - - - - - | 47 | — | — | 1 |
| 28 | Castleford - - - - - | November 3, 1893 - - - - - | 57 | 1 | — | — |
| 29 | do. - - - - - | November 27, 1893 - - - - - | 58 | — | — | 1 |
| 30 | do. - - - - - | December 30, 1893 - - - - - | 68 | 1 | — | — |
| 31 | do. - - - - - | do. - - - - - | 60 | — | — | 1 |
| 32 | do. - - - - - | January 15, 1894 - - - - - | 46 | — | — | 1 |
| 33 | do. - - - - - | February 28, 1894 - - - - - | 61 | — | 1 | — |
| 34 | do. - - - - - | do. - - - - - | 59 | — | 1 | — |
| 35 | Thornhill, Lees - - - - - | June 22, 1894 - - - - - | — | 1 | — | — |
| 36 | Castleford - - - - - | July 2, 1894 - - - - - | 55 | 1 | — | — |
| 37 | Wakefield - - - - - | July 9, 1894 - - - - - | 64 | 1 | — | — |
| 38 | Castleford - - - - - | October 15, 1894 - - - - - | 57 | — | 1 | — |
| 39 | do. - - - - - | December 10, 1894 - - - - - | 53 | — | — | 1 |
| 40 | Hunslet - - - - - | March 25, 1895 - - - - - | 51 | — | — | 1 |
| 41 | Castleford - - - - - | June 3, 1895 - - - - - | 60 | 1 | — | — |
| 42 | do. - - - - - | July 8, 1895 - - - - - | 58 | — | — | 1 |
| 43 | Hunslet - - - - - | August 2, 1895 - - - - - | — | — | — | 1 |
| 44 | Castleford - - - - - | September 30, 1895 - - - - - | 55 | — | — | 1 |
| 45 | do. - - - - - | do. - - - - - | 65 | — | — | 1 |
| 46 | do. - - - - - | do. - - - - - | 48 | — | 1 | — |
| 47 | Blaydon - - - - - | April 8, 1896 - - - - - | 52 | — | 1 | — |
| 48 | Knottingley - - - - - | March 9, 1896 - - - - - | 54 | No | Certificate. | |
| 49 | Castleford - - - - - | April 6, 1896 - - - - - | 60 | — | 1 | — |
| 50 | do. - - - - - | April 20, 1896 - - - - - | 58 | — | — | 1 |
| 51 | Hunslet - - - - - | May 10, 1896 - - - - - | 57 | 1 | — | — |
| 52 | Masbro' - - - - - | do. - - - - - | 55 | — | — | 1 |
| 53 | Castleford - - - - - | May 11, 1896 - - - - - | 65 | 1 | — | — |
| 54 | Barnsley - - - - - | May 30, 1896 - - - - - | 59 | 1 | — | — |
| 55 | Castleford - - - - - | June 20, 1896 - - - - - | 54 | — | 1 | — |
| 56 | do. - - - - - | do. - - - - - | 56 | — | 1 | — |
| 57 | Swinton - - - - - | August 1, 1896 - - - - - | 64 | — | — | 1 |
| 58 | Castleford - - - - - | September 7, 1896 - - - - - | — | — | — | 1 |
| 59 | do. - - - - - | do. - - - - - | 56 | 1 | — | — |
| 60 | Wakefield - - - - - | September 20, 1896 - - - - - | 57 | — | — | 1 |
| 61 | Knottingley - - - - - | do. - - - - - | — | — | — | 1 |
| 62 | Wakefield - - - - - | do. - - - - - | 59 | — | — | 1 |

Mr. A.
Greenwood.
5 Mar. 1907.

| No. | Branch. | Date. | Age. | Cataract. | Defective Sight. | Various Causes. |
|-----------------|-----------------------|------------------------------|------|-----------|------------------|-----------------|
| 63 | Masbro' - - - - - | October 17, 1896 - - - - - | 55 | 1 | — | — |
| 64 | Castleford - - - - - | November 2, 1896 - - - - - | 49 | 1 | — | — |
| 65 | do. - - - - - | do. - - - - - | 60 | No | Certificate. | |
| 66 | Swinton - - - - - | December 12, 1896 - - - - - | 60 | 1 | — | — |
| 67 | Castleford - - - - - | January 11, 1897 - - - - - | 51 | — | — | 1 |
| 68 | do. - - - - - | do. - - - - - | 58 | — | — | 1 |
| 69 | do. - - - - - | February 1, 1897 - - - - - | 62 | — | — | 1 |
| 70 | do. - - - - - | March 6, 1897 - - - - - | 58 | — | — | 1 |
| 71 | do. - - - - - | do. - - - - - | 52 | — | — | 1 |
| 72 | Swinton - - - - - | March 8, 1897 - - - - - | 60 | — | — | 1 |
| 73 | Wakefield - - - - - | do. - - - - - | 50 | — | — | 1 |
| 74 | Hunslet - - - - - | March 29, 1897 - - - - - | — | — | — | 1 |
| 75 | Knottingley - - - - - | April 11, 1897 - - - - - | 53 | — | 1 | — |
| 76 | Castleford - - - - - | June 21, 1897 - - - - - | 47 | — | 1 | — |
| 77 | Swinton - - - - - | July 10, 1897 - - - - - | — | — | — | 1 |
| 78 | do. - - - - - | do. - - - - - | — | — | — | 1 |
| 79 | Knottingley - - - - - | September 11, 1897 - - - - - | 48 | — | — | 1 |
| 80 | Conisbro' - - - - - | October 3, 1897 - - - - - | 54 | — | 1 | — |
| 81 | Castleford - - - - - | October 4, 1897 - - - - - | 55 | — | — | 1 |
| 82 | Blaydon - - - - - | October 30, 1897 - - - - - | 57 | — | 1 | — |
| 83 | Conisbro' - - - - - | December 2, 1897 - - - - - | — | — | — | 1 |
| 84 | Swinton - - - - - | December 11, 1897 - - - - - | 65 | No | Certificate. | |
| 85 | Hunslet - - - - - | December 27, 1897 - - - - - | 54 | — | 1 | — |
| Total - - - - - | | | - - | 15 | 23 | 33 |

SUMMARY.

| | |
|----------------------------------|----|
| Cases of Cataract - - - - - | 15 |
| Defective sight, etc. - - - - - | 23 |
| | 38 |
| Various other Diseases - - - - - | 33 |
| | 71 |
| No Certificates - - - - - | 14 |
| Total - - - - - | 85 |

8827. (Chairman.) The summary of the table shows, does it, that there were 85 cases of superannuation between the years 1891 and 1897, and of those 15 were cases of cataract, 23 were cases of defective eyesight, and 33 other diseases, and in 14 cases there were no certificates?—Yes. “No certificates” means that I have not been able to find them at present.

8828. So that really, 38 cases out of 71 were cases of cataract or defective sight?—Yes, and that is a very striking table.

8829. (Mr. Cunynghame.) The trade is divided into three groups apparently—bottle makers, blowers, and gatherers?—Yes. A bottle maker or finisher, then the blower, who blows the bottle in the mould, and the gatherer is the person who collects the metal out of the furnace.

8830. What are the proportions of the men employed; how many are there of each kind?—They are equal in numbers.

8831. Has it always been so; have they always been pretty equal?—Yes.

8832. Do the three men work together in what is called a chair?—Yes, a chair or group.

8833. If that is so, the table you have handed in shows in a very remarkable way that the cataract occurred almost entirely among the makers, and that the blowers and the gatherers do not get it much?—That is so.

8834. Therefore, if the bottle makers, blowers, and gatherers are about equal in number, it shows there must be something very abnormal taking place in the case of the makers?—That is so.

8835. Why is it that the makers get cataract more than the blowers and gatherers?—I can only account for it by reason of their being exposed to the intense heat and glare from the furnace.

8836. But the blowers and gatherers are exposed to

Mr. A. Greenwood. it too, are they not?—The blowers are not exposed to it at all.

5 Mar. 1907. 8837. But the gatherers would be, would they not?—The gatherers are exposed to it.

8838. Why do the gatherers not suffer from the same thing? I can understand why the blower does not get cataract, because he is not near the furnace, but why does not the gatherer get cataract?—He may have it incipiently for a time and not know it. Gatherers are employed from perhaps 17 to 21 years of age.

8839. Do the gatherers go on and become blowers?—Yes.

8840. And then become bottle finishers. The reason of bottle finishers being affected is because they have been longest in the trade, is it?—Yes.

8841. They could all of them protect themselves completely with blue glasses, could they not?—It is not so convenient to work with glasses as without, but I am of opinion, and agree with Dr. Robinson, that if they wore glasses they would be a protection to the eye. I am certainly of that opinion.

8842. And a complete protection? The difficulty is, can you claim that a disease should be put in the schedule which is preventable by using proper means?—I could not say that glasses would be a complete preventive of cataract and other eye diseases. And there is an inconvenience in the men using glasses.

8843. (*Professor Allbutt.*) What is the inconvenience?—There is inconvenience from sweating so much. The sweat will pour off healthy men, and run into their eyes, and they cannot wipe them for the glasses.

8844. (*Mr. Cunynghame.*) But is there not now an invention which enables glasses to be used perfectly, however much the sweat—painting the glasses over with a preparation?—I do not know of that.

8845. (*Professor Allbutt.*) Have you tried very fine wire grating instead of glasses?—No, the wire would

rust, and would not answer. The spectacle frames rust and even break.

8846. (*Mr. Cunynghame.*) At any rate, it is inconvenient, you say?—Yes, but they had better suffer inconvenience than lose their sight, I admit. Dr. Walker suggested to me to try lasin. I got permission to take him through a works several years ago to see the men work. The men tried lasin, and it does answer in some measure in preventing condensation of the vapour.

8847. It looks to me as if a case had been made out for a special rule, compelling the men to wear glasses?—I do not know about that. The lasin does not prevent the sweat from running into their eyes, and they cannot take off their glasses to wipe their eyes.

8848. The Secretary of State has power, you know, to make special rules, and has not a case been made out here, if the men are doing what is a dangerous thing for their sight, for a special rule, compelling them to wear glasses?—Many of them do not know when they are suffering until disease has set in.

8849. But would not it be wise to have a special rule compelling them all to wear glasses?—I could scarcely answer that question in the affirmative.

8850. (*Professor Allbutt.*) Do you mean that it is an inconvenience or a disadvantage?—It is both; it is an inconvenience and it is also a disadvantage.

8851. Do you mean they would earn less money?—No, they would not earn less money, but the glasses might give way, and cause them to injure someone in their working. In my proof I say I should suppose that very seldom does a workman know that he is developing cataract. I worked at the furnace myself until I was 51 years of age, and I did not know that my vision was defective for many years, and that I was suffering from choroiditis and retinitis, until after I commenced to wear spectacles for reading.

8852. From what you know now would you, if you were beginning your life-work over again, wear spectacles?—Yes, I would.

TWENTY-NINTH DAY.

Monday, 11th March 1907.

MEMBERS PRESENT :

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. T. W. STUART, called and examined.

Mr. T. W. Stuart.

8853. (*Chairman.*) Are you the General Technical Manager of the United Alkali Company?—Yes.

8854. Does your company manufacture a very large variety of different chemical products?—Yes.

8855. In some of your works, for example, in some processes carbon bisulphide is evolved, is it not?—Yes.

8856. Do you ever have cases of men being poisoned by that?—No. We have had occasions where men have been what is known as "gassed" by the accidental leakage of bisulphide of carbon fumes, and immediate measures are taken to get them into the fresh air and run them about, and so on; but we have had no fatal case arising from it in any way.

8857. Have you had any cases of men who are gradually poisoned by working in that gas?—No. If they show any symptoms of ill-health we send them away to the country for a few weeks at our own expense, and when they return they come back to

their own jobs, and if we find they are not healthy we remove them to another part of the works altogether. I have a photograph of the works, and when we built them we took care to erect them in an exceedingly breezy position on the upper reaches of the Mersey, where there is constant exposure to fresh air, so that the plant is all very open and exposed to strong, fresh air from the Mersey; in that way, instead of being confined, we have enjoyed, I am glad to say, immunity from any death or ill-health, except as I have described, where the men are sent away and return well after a short holiday.

8858. You are aware, I suppose, that in india-rubber works there have been cases of such poisoning, although they are now exceedingly rare?—Yes.

8859. Do you see any objection to scheduling poisoning by bisulphide to the Workmen's Compensation Act?—None, except that it would add to our expense.

8860. But if you never have any cases it would not

matter, would it?—I quite recognise your point. If we have no cases you would naturally say, "You need not be afraid." Of course it would increase the expense of my company for insurance; but all I can say is that we enjoy, I am glad to say, great immunity from death and ill-health. The only objection I see to it is that it would add to our expense. But your answer to that would be, "You have no cases."

8861. Why should you insure against such risks if you have no cases?—That is another way of looking at it, no doubt.

8862. With regard to dinitro-benzol, what do you say?—We have only been working at that a very short time—only a few weeks—on a very small scale; but all these other gases we manufacture in gigantic quantities, the largest in the world.

8863. Have you had any cases of ill-health through working dinitro-benzol?—Not yet. We have only been, as I say, in operation a very short time—a few weeks, or a month or two at the outside. I think some of the larger manufacturers of dinitro-benzol will be able to give better evidence than I can.

8864. With reference to sulphuretted hydrogen, have you had any cases of sickness?—No.

8865. Or with chlorine?—No.

8866. Or nitrous fumes?—With regard to nitrous fumes, I can remember, during my forty-one years' experience, two cases only of death from nitrous fumes, arising from the men going into cisterns on the tops of towers to clean them out. They contain a deposit of sulphate of lead, which is dried up with sawdust; the men go in there with india-rubber boots on, and after the vitriol is run away they mix the deposit up with sawdust, and so clean the cistern out. I have known two cases in which men engaged in that work went home apparently perfectly well and died during the night. It is a very insidious gas.

8867. Have you had instances of men who, without suffering fatally from exposure to the gas, have been incapacitated by it?—No. In all the cases where we use nitrous fumes the nitrate of soda and sulphuric acid are put into the burners, where there is a draught inward, so that when a man puts the substances in, and the fumes are evolved, they go inward. It is a very valuable gas, and therefore we take great care of it. I have had no other cases except those two I have mentioned, and that was many years ago.

8868. And those would be considered injuries, I suppose, by accident within the meaning of the Act?—Yes, I think they would.

8869. What have you to say with regard to hydrochloric acid fumes?—I have had no cases.

8870. Or ammonium chloride fumes?—We only manufacture chloride of ammonium in our Bristol works, and I wrote for a special report from our manager, who has been thirty-five years there, and he says: "In reply to your inquiry respecting this manufacture, it has been in operation at these works, under my personal supervision, for the last twenty-nine years. We manufacture about 2,600 tons of chloride of ammonium per annum from the raw gas liquor produced at gasworks by the carbonisation of coal. About 500 tons of the above-named quantity of chloride of ammonium is converted into sal ammoniac; that is to say, the chloride of ammonium is thoroughly dried and got into a conglomerate state, and afterwards placed in iron pots lined with brickwork, and there heated so as to form a vapour of chloride of ammonium, and the resulting vapour sublimed on to an iron dome covering the pot. During the whole of my experience I have never known any ill effects occur to any of our workmen employed in either of these departments, nor is there anything, so far as my experience goes, that could lead to any such conclusion. We have men at present working in these departments who have been constantly employed there for between thirty and forty years. They are apparently in the best of health, and I see no reason why these departments should not be amongst the healthiest in these works.—Yours truly, William Windus."

8871. Do you have many cases of workpeople suffering from bronchitis?—No. I have submitted to Mr. Elliott the statistics, from which you will see that the bronchitis is not above the normal of ordinary occupations.

8872. It varies very much; in some works there is seven times as much bronchitis as in others, I see?—Yes. It is not specially a disease incidental to our manufacture.

8873. What do you say as to lung diseases?—You will see from the statement that the average death-rate runs to about 13·5, which is a very fair record.

8874. Do these figures show that in your works the percentage of days on which men are unemployed through sickness varies from 2·19 to 4·5?—Yes, I should think that is probably the percentage of ailments in works such as engineering works and others.

8875. (*Professor Allbutt.*) How many men have you had to send into the country to recover?—I am speaking from memory, but during the time we have been working with cyanide of sodium, which is a very deadly poison, of which we manufacture about fourteen tons a week, if I were to say from six to nine or a dozen during the whole seven years I should be about correct. If you want the information accurately, I can get it for you. In connection with the manufacture of cyanide of sodium, I might say that the men appear to thrive for a time, and become well-looking and healthy, but then, in the course of time, some of them—a very small percentage—become poorly, and then we embrace the opportunity of sending them away for their health. We are particularly careful that men having abrasions or cuts, or men of a poor physique, should not be allowed to work in this department. When we commenced the manufacture seven years ago, bi-sulphide of carbon and hydrocyanic acid being the important products of the raw materials, we were in a state of great anxiety lest we should have some terrible results as to ill-health and death; but, owing to the extraordinary precautions we have taken and the perfection of the plant, I am glad to say that we have not had a single death, except one which arose from an explosion; it was not caused by the inhalation of fumes, but due to the impact of the gases producing an explosion. With that exception, we have had no ill-health except such as could be cured within a fortnight. As I say, we were in a state of great terror to begin with, because working with hydrocyanic fumes is no child's play. But now we manipulate hydrocyanic acid fumes equal to fourteen tons of cyanide of sodium per week, and it gives us no anxiety.

8876. What is it used for?—The treatment of tailings in gold mines in South Africa, and so on.

8877. So that it is your opinion that there is no direct poisoning arising from the work itself?—Not as we work it.

8878. But while the scheduling of any one of these diseases might not affect you very much, it might not be a disadvantage if applied to other firms, I suppose?—Clearly, whose positions are not so good as ours, and who may not be perhaps so conscious of the danger.

8879. So that there is that argument in favour of scheduling it, is there not?—There is that argument, I admit.

8880. (*Dr. Legge.*) How many men have you employed in the bi-sulphide of carbon department?—Twelve.

8881. And in the cyanide of sodium department?—Twenty-six.

8882. Are they constantly employed?—Yes.

8883-4. Have you a medical officer who examines the workers periodically?—Yes—not periodically. We have the local doctor in the village, who examines them for us when we suspect they are ill.

8885. Do you think he would be able to give the Committee exact information as to the symptoms produced by cyanide of sodium?—I am sure he would.

Mr. T. W.
Stuart.

11 Mar. 1907.

Mr. JAMES BEATTY, M.D., called and examined.

Mr. J. Beatty, M.D. 8886. (Chairman.) Are you the Medical Officer of Health at Northampton?—Yes.

11 Mar. 1907. 8887. And you are good enough to come and tell the Committee about the diseases which boot workers suffer from owing to the employment in which they are engaged. Taking first poisoning by chrysoidine, what do you say?—I cannot give you any information with regard to that. Poisoning by chrysoidine has not come under my observation to any extent. During the years 1897 to 1904 I have only been able to find four deaths from blood poisoning amongst shoe workers, so that it does not appear to be a prevalent disease.

8888. It does not appear to be a usual cause of death, but it might be a usual cause of incapacity, I suppose?—As regards that I have no information.

8889. Coming to the question of phthisis, I think some little time ago you prepared some statistics showing the rates of mortality from various diseases, and among them the boot and shoe workers of Northampton, which were published by the Royal Sanitary Institute?—Yes.

8890. What conclusion do you draw from the statistics which you collected?—I found that there was an increased prevalence of the disease of phthisis amongst boot and shoe workers, as compared with the rate for the country generally.

8891. Are there any particular classes amongst those workers who are specially liable?—Yes, I found that clickers were especially liable.

8892. What work do they have to perform?—When the leather is brought in in the form of a hide that has been just prepared, they have to cut up the leather into the shape required for the uppers of the boots. They have little patterns made of tin or other metal, which they place on the leather, and run it round with a sharp knife. They do this on a board, and at the end of the operation the point of the knife catches in the wood, hence the word "click."

8893. Why are they specially liable to lung diseases, do you think?—I have heard two reasons given. The first is that in their work they stoop a great deal. They work, generally speaking, standing, and they stoop over their work, which rather tends, of course, to act on the chest and diminish its capacity; and, secondly, clicking is supposed to be, amongst boot and shoe workers, the gentleman's part of the work; it is supposed to be easy work, and work at which, as a man put it to me, you could wear a collar. The result is that the delicate one of the family is put to that part of the trade.

8894. In fact, your idea is, is it, that a man does not become delicate because he is a clicker, but that he becomes a clicker because he is delicate?—In my opinion, that is so.

8895. In your opinion, is the phthisis they contract tubercular or fibroid?—Tubercular.

8896. Do you get cases of fibroid phthisis?—There are a few in the town, but as a general rule the cases are the ordinary tubercular phthisis.

8897. The special form of phthisis in this place is tubercular phthisis, is it?—Yes.

8898. With regard to lasters, they have a death-rate from phthisis not very much less than that of clickers; at all events, a very high death-rate, is it not?—Yes. Lasters are not a very well-defined class. In the earlier part of my paper which I read before the Royal Sanitary Institute in 1905, I point out that I had to use it as a sort of dumping ground for all classes of workers I could not find a place for. Their work, therefore, may be taken as representative of the shoe trade in general in a manufactory, and, as you say, there is a prevalence, but I think that is practically a prevalence of the disease amongst shoe workers in general of the male sex.

8899. In the figures you give on page 586 of the reprint before me, the mortality figure of phthisis amongst shoemakers is 256, is it not?—Yes.

8900. Amongst lasters, I see, it is 320, and amongst clickers 391?—Yes. If you will turn to page 584 of the paper you will see the actual death rates calculated. The death rate for shoeworkers undoubtedly is above the average as a whole, and it is more above

the average among male operatives than among female operatives. Male and female taken together bring the figure down to 2.59. As I say, it is prevalent amongst shoeworkers, and lasters are practically a representative class of shoeworkers; but I could give no special reason in that case.

8901. (Mr. Cunynghame.) What is the general figure of phthisis for the whole population?—On page 585 at the bottom you will find the figure, 2.08.

8902. (Chairman.) What is it amongst boot and shoe workers?—2.59 for the whole number. I have not worked it out for males separately.

8903. So that the rate in the trade is about 25 per cent. more than it is in the rest of the population?—If you notice, at the top of page 586, Dr. Tatham puts it down as 38 per cent.

8904. If you were to take a selected class, say the clickers, would it be very much higher?—Yes, it would. I must remark, however, that my figures are comparatively small. On page 584 you will find I am calculating in the extended borough from a body of clickers numbering about 1,500.

8905. And you only have among them forty deaths from phthisis in eight years?—That is so.

8906. So that if there had happened to be thirty-eight deaths it would very largely have affected the figure?—Yes. I point out that the figures are to be taken with some reserve on that account. I must say, however, that the impression amongst those in Northampton with whom I have spoken is that there is a higher rate of mortality amongst clickers from phthisis.

8907. But since it is tubercular phthisis, in any given case it is impossible to say whether or not the disease is due to the employment; it is not like dust phthisis, is it?—No, that is quite true. I have investigated a great number of cases, and I find that in a large proportion of them a sufficient cause can be found in consumptive relatives; that is to say, the disease would be contracted at home.

8908. Bootmakers, having been engaged generation after generation in working in a confined space without very much ventilation, are perhaps specially liable to chest diseases as a class?—I should think at present that is quite possible, but I may say that phthisis is diminishing with a fair amount of rapidity in Northampton.

8909. Do you attribute that to improvements in the methods of production or to a general improvement in the sanitary surroundings of the population?—To both. Up to about fifteen years ago, I believe, the boot trade was a home trade and it is only within recent years that it has become a factory trade. In the home trade the people used to work in cellars, where, of course, the ventilation was bad, and in connection with one of the processes the work involved the use of gas stoves, or perhaps in those days oil lamps. That would further vitiate the atmosphere. At the present time, as a general rule, they work in large, fairly well ventilated factories. That is one point. Then I do not think there can be any doubt whatever that the general improvement in the sanitary conditions throughout the country has also had an effect on Northampton.

8910. Supposing this disease were scheduled for compensation under the Workmen's Compensation Act, do you think it would be possible in any given case for any medical man, or for a Court of Law, to say whether or not a case of phthisis was due to the employment?—As distinguished from a case of a consumptive workfellow close by, do you mean?

8911. I will say, was due to having been engaged in that industry, taking into account all the circumstances of the industry. Of course, if the industry makes the men specially liable to infection, it might be said the infection was due to the industry?—I think it would be very difficult, and I fail to see how it could be done. As I say, workfellows do cause a certain percentage of the cases. In 1905 I have figures of 124 cases investigated, and, with all our investigations, we could not find in fifty cases more than ten cases traceable to workfellows, and to work-

places six, and that is only a guess on our part, and I doubt very much if it could be stated definitely.

8912. Suppose any one of those men on the list claimed compensation for having contracted phthisis during his employment, would you be able in any particular case to go into the witness-box and say, "Yes, I am of opinion this man's phthisis is due to his employment"?—Yes, in one case I think I could, supposing the man had been a finisher, because this part of the business is the part which one would most naturally expect to be productive of the disease on account of the dust in it. In the finishing process they put the sole of the boot over an emery or glasspaper wheel, and rub off a great deal of dust from it, with, of course, a certain amount of brass filings from the rivets. In that case, of course, there is a good deal of dust produced, which is taken away by fans; but nevertheless a certain amount gets into the throats of the workmen. If I found that in a factory concerned the dust was not properly taken off and the men developed phthisis, and I could not find any other cause for it, I should be disposed to say that in that case probably the disease had originated from the man's employment, or that his lungs had been so weakened that he was rendered liable to it.

8913. Those would be cases of tubercular phthisis, and not fibroid phthisis?—Not fibroid phthisis.

8914. Out of the 124 cases that you specially investigated, of how many do you think you could say with certainty in that way, "This man's disease is due to his employment"?—To none. I could not say it with certainty as to any of them, there is only a probability.

8915. In how many cases would you be prepared to say it was probable?—You see, that involves an investigation into the conditions of the factory, and that, being a medical officer, I have not carried out. If we get a complaint with regard to a factory, it goes to the factory inspector. In many of the cases where want of ventilation is complained of I have investigated them, and in my opinion the complaints were not justified.

8916. I think you said there were six out of the 124 cases where the factory conditions were to blame?—The conditions were defective, but they were not to blame for the disease.

8917. So that at the most would you say six out of the 124 cases might have been due to the employment?—That is what I should say, exclusive of workfellows causing it by infection.

8918. Could that ever be proved?—I do not think so; I think it remains a guess.

8919. Out of those, are you able to say, with some degree of certainty, that the disease was due to the employment—say in four or two cases?—No, I am not.

8920. (*Mr. Cunynghame.*) You referred to an average mortality of 2.08 from phthisis.—That is the average rate among males in the country generally.

8921. Very well, I will take it for males. The average is 2.08; the average derived from Table II. is 2.59, is it not?—Yes.

8922. The figure 2.08 would not be the figure for sedentary occupations, would it?—No, for the entire country.

8923. So that if you take the whole figure for the entire country for sedentary occupations it would much more approach the 2.59?—Yes.

8924. At the end of your paper you say: "I may conclude by another quotation from Dr. Tatham, which is in entire accordance with the figures I have given you. He says: 'Although the contrary is generally held to be the fact, shoemakers are shown, by the figures now at our disposal, to enjoy a degree of health which is at least equal to that of the average working man.'" Is that the general conclusion you draw?—Yes, it is.

8925. (*Professor Albutt.*) One of your points I think is that disease may be caused by the incidents of the occupation; amongst those incidents have you found, as a matter of practice, that the fans for carrying off the dust have not been always in order?—Not always.

8926. As regards open windows, that is a very bad

way of ventilating a building of the factory kind, is it not?—Yes, it is, in my opinion.

8927. That is defective construction, is it not?—My view is that a place ought to be artificially warmed.

8928. As regards the Chairman's question concerning a particular case of consumption and the causation of it, your difficulty is the old difficulty of applying an average to a particular case, is it not?—Precisely.

8929. Although you may be morally certain that there is a very considerable element of industrial causation, to apply this knowledge to an individual case is extremely difficult?—Yes, there is this difficulty in the matter that I have met with in Northampton. Supposing the industry was mainly at the root of the disease, what I cannot understand is, that those factories which appear from our statistics to have the greatest number of phthisis cases among them are, instead of being the ill-ventilated, small places, the large new factories. That may be partly due to the greater numbers employed in them, but on the whole I think it is more probably due to an average distribution.

8930. The more men who are spitting about floors and so forth in a room, the greater would be the prevalence of phthisis, I suppose?—Unquestionably.

8931. Its prevalence in men's workplaces, as compared with women's, might be explained in that way, by their being more reckless in their spitting?—Yes, it is possible it may be so.

8932. Is any attempt made to stop expectoration?—Yes, we have issued posters to all the factories on the subject, urging the men not to spit, and, in addition to that, every case of consumption notified to me, or known to me through the death returns, is investigated, and instructions are sent out. I am informed through the Charity Organisation Society that our work is beginning to tell in this way, that consumptives find it difficult to get employment, because other people will not work with them.

8933. It is premature, I suppose, to ask you what the effect is, but have you reason to believe the habits of the men are changing?—Yes, at any rate, there has been a considerable reduction in 1906 of the death-rate; whether that be due to our action or not, such is the case. As a matter of fact, Northampton fell in the 1906 figures to one of the seven large towns standing lowest for the phthisis death-rate. Of course, it might have been an exceptional year, but the number of deaths fell off 20 per cent.

8934. You have no compulsory notification in the case of phthisis, but you have a voluntary system of notification?—Yes.

8935. Is there a good return under the system?—There was last year. We doubled it last year. Our number of deaths last year was 81, and our notifications were 125.

8936. Voluntary notification may become still better organised. Meanwhile you have no powers, I suppose, to control the employment of a man with advanced phthisis in a large clickers' room?—No, you have not, but under those conditions by preaching the doctrine it will advertise itself.

8937. There are no differential signs or symptoms, are there, by which you could select from a number of cases of phthisis those in which the disease is probably due to the industrial conditions?—No, in my opinion there are not.

8938. (*Dr. Legge.*) I believe in Manchester, with Dr. Niven, you made a large number of examinations of dusts which you collected?—Personally, I did not; my colleague did that.

8939. Have you done similar work in the factories and workshops of Northampton?—I have not.

8940. (*Chairman.*) Have you analysed the figures of death from phthisis in 1906 by trades?—I cannot say that those have been worked out completely yet. I have the figures for 1905. I can only tell you that we find clickers head the list in 1906, but the number of deaths was only seven.

8941. Does the fall of 20 per cent. in the deaths from phthisis over the whole town apply also to the boot and shoe workers, do you think?—It does.

8942. But you cannot say yet whether the fall is greater than 20 per cent. amongst them?—No.

Mr. J.
Beatty, M.D.
11 Mar. 1907.

Mr. RAUCH and Mr. L. MORROW (Members), and Mr. F. C. TOLHURST (London Branch Secretary), of the Amalgamated Society of Lithographic Artists, Designers, Engravers, and Process Workers, called and examined.

Mr. Rauch, 8943. (Chairman.) Do you attend here on behalf of the lithographic artists, designers, engravers, and process workers' trade union?—(Mr. Morrow.) Yes.

Mr. L. Morrow, and 8944. Do your members suffer from any particular disease or injury from their occupation?—Yes, they do.

Mr. F. C. Tolhurst. 8945. What disease have you in mind?—I, personally, have had nasty eruptions and irritations on my hands and arms and head.

11 Mar. 1907. 8946. To what do you attribute that?—Bi-chromate of ammonia.

8947. What do you use that for?—In sensitising solution in preparing plates for etching.

8948. Is that the only process in which it is used?—No, I believe it is also used in other trades. We only use it in the printing and photo engraving.

8949. Do you suffer from poisoning from any other chemicals?—No, never.

8950. Do you attribute this rash which you have described simply to bi-chromate of ammonia?—Yes.

8951. What are the further symptoms?—I have been away from it about twelve months, but you can see it under the skin of my hands now. Twelve months ago you could see fifty or sixty abrasions on my hands, and the skin came off, and my hands and arms were a fearful sight. The first time I had it I had it fairly severely. I went to the University Hospital at Gower Street, where they seemed to treat it as eczema, but the stuff they gave me did not seem to have any effect. I then tried taking blood-purifying medicine and greases at night, and I went to a doctor, and he thought it was eczema, and treated me for it. The salt in the bichromate seems to dry the skin.

8952. Are you prevented from working by it?—Yes, I was last year, it was so bad. My hands and one arm were in such a fearful state that I could not touch anything.

8953. Do you find many others working in the trade who suffer in the same way?—Yes.

8954. Have you any statistics to show how many suffer in that way?—I have no official statistics, but the majority of the men who are printers catch bi-chromate poisoning.

8955. Do they get it again and again, or only once?—Once you get it you are always having it.

8956. You are liable to its recurring, are you?—Yes.

8957. Does your trade union give sick benefit?—Yes.

8958. After how long a period of incapacity can a man claim sick benefit—after he has been off work how long?—After he has been away from work three days he can claim.

8959. Have you any records of the diseases from which the men who claim sick benefit are suffering?—(Mr. Tolhurst.) In all cases of applications for sick benefit we receive a medical certificate, which frequently does not state the disease. It only says that a certain man of a certain name is unable to follow his employment, and it is signed by the medical practitioner. I went through the doctors' certificates, which have to be supplied prior to sick benefit being paid, and in a number of cases there is an omission of statement of the disease.

8960. Of those which did specify the disease, were there many that stated that the man was suffering from this form of eczema or eruption?—No.

8961. Were there any?—None of them quoted "bi-chromate poisoning."

8962. Do you have to handle this chemical?—(Mr. Morrow.) Yes.

8963. Would not it be possible to prevent it getting on your hands?—I have tried using india-rubber gloves, but they are very cumbersome; the plates we have to handle have to be handled rather delicately, and it is almost impossible to work with gloves; I found I could not. I used as far as possible to avoid getting it on my fingers at all in covering the plate, but you get it into your hands when you are developing. You have to place the plates in water, and you must handle them a little while you are washing them,

and although you might only get a very little of the weak solution on your fingers, it seems to penetrate.

8964. Do the men usually come back to their work after suffering from this complaint in a period of less than some weeks?—In my own experience it lasted five weeks and three days, and then I went back to another branch.

8965. Are other men you know of usually incapacitated as long as that?—I do not know of any man who was incapacitated as long as that. They try and doctor themselves and rub along, but their hands are in a frightful state.

8966. It is a well-recognised disease in the trade, is it?—It is.

8967. And there is no doubt about its being due to that particular chemical, and not to any other?—No.

8968. Have you anything to add to what has been said by Mr. Morrow?—(Mr. Rauch.) I have had some years' experience, and I think Mr. Morrow has stated the thing very lightly. There have been one or two cases in America where total blindness occurred through the disease, because it affects the system. There is a case of a young man, at present at work in the Old Bailey, where the disease has broken out all over his stomach, which is a very dangerous place. He was away three months at Margate, and on his return they had to put him into another department. If you go to a medical man he always tells you you must stop this branch of the work.

8969. Have you yourself suffered from this disease?—Yes; I have still got the traces of it, and I think more fully developed than Mr. Morrow.

8970. How long were you prevented from working?—I was sent to the seaside, and was there for a long time. The medical men seemed to treat the thing only as a common skin disease; but the seaside is the worst place for it, because all salt irritates it.

8971. How long were you prevented from working?—On and off for about two or three months.

8972. What was the longest period that you were away from your work at one time?—For about five weeks.

8973. Do you know many men who have suffered from similar complaints?—Yes. I cannot tell you where they are now, because they have left the trade, but I have known them have to leave it altogether.

8974. (Mr. Cunynghame.) Have you ever tried wax and size—as a cure?—I have.

8975. Is it any good?—Not much.

8976. Why is not it any good?—Because you have your hands always in the water.

8977. It is warm water you develop in, is it?—No; cold water.

8978. Is there a constant flow of cold water, or does the tank become very much discoloured in which you are working?—(Mr. Morrow.) There is a constant flow.

8979. And even with a constant flow enough of the stuff remains in it to damage your hands?—Yes; because you keep on dealing with different plates, and you keep on drying your hands. Your hands are perhaps wet for five or ten minutes while you are developing.

8980. How does the bi-chromate get on to your hands in developing? For instance, you have a plate covered with dry bi-chromate after being exposed; then if you take a dry plate it does not come off dry, does it?—No.

8981. How does it begin to come off? Do you put the whole plate into the water?—Yes.

8982. Then does the stuff flow over your fingers?—Yes; you put your hand into it.

8983. But if you were to dip the plate into the Thames, with a mass of water going by, it would not hurt you, I suppose?—No; it is not the one plate which hurts you, it is the large number of plates continually passing through your hands.

8984. But if the stuff were diluted by a tremendous

rush of water you would not get it, I suppose?—It is impossible to minimise the effects.

8985. Could not you hold the plates in a wire holder, for instance, and dip them in that way?—You can small plates. Personally I have put a large plate into a sink, and let the water run on it.

8986. But I do not see why it is necessary in washing that you should touch it with your hands at all. If you had machinery you could put it into a frame, as it were, and let the water go on it, and not touch it with your hands at all. That would be quite possible, would it not?—I should think it could be made possible.

8987. (*Professor Allbutt.*) You are a worker, I understand, in bi-chromate?—I have been.

8988. And you have shown us your hands?—Yes.

8989. And you say the eruption is due to that work?—Yes.

(*Note.*—*Dr. Legge* and *Professor Allbutt* having examined *Mr. Morrow's* hands, find the palms especially the seat of old eczema. In examining *Mr. Rauch's* hands they find superficial ulceration on both the backs and palms of the hands.)

8990. (*Professor Allbutt.*) Do you go so far as to regard this as universal, and to say that all the workers have it?—(*Mr. Morrow.*) No; a large majority of the printers get it.

8991. Do you think it might in part be due to the continual wetting of the hands, even if there was no salt in use?—No; because in etching, where we use a lot of water, I have never got it.

8992. Have you ever used any ointment of any kind to keep the skin soft?—I have.

8993. Has that been any advantage?—It eases them a little. You generally get them a little better week ends.

8994. Have you to wash your hands very much in soap?—Yes, a good deal to keep them well cleaned.

8995. Do you use common soap?—I have tried Cuticura.

8996. Because there are superfatted soaps, which do not affect the skin so much as common soap does. Does the complaint frequently extend to the armpit in the way you speak of?—Not with me.

8997. Have you often heard of it?—Yes.

8998. And is that the way in which a man is more usually quite incapacitated?—Yes. I have heard of other people having abscesses right in the armpit.

8999. (*Dr. Legge.*) Has it ever affected the nose in any of the cases you have heard of?—Yes, I did hear of one man who was so affected; but it never was so with me.

9000. How was his nose affected?—(*Mr. Rauch.*) Almost the same as the breaking out on the arm. It comes up first like a pimple, and breaks out in sores, which discharge water. I know a gentleman now who has it all over his face.

9001. Are there fumes rising up into the face, or is it part of the general breaking out which causes it? Is there any smell from the process?—We have to prepare the plates over a gas stove, and there is a splash. There are no fumes, but there is always a dust when the plates are dry, and you are continually bending over it.

9002. Then it is the dust that has the injurious action, you think?—Yes.

9003. Does your union include photographers?—(*Mr. Morrow.*) Yes.

9004. And is this stuff used largely in photography?—Not with our photography.

9005. Does the general photographer use it?—I think not.

9006. What is the number of the members of your union?—(*Mr. Tolhurst.*) There are 430 members in the London branch, and 1,500 in the society altogether. The photographers in our craft are those who start with the negative. This particular branch is composed of men who print on metal with a solution of bi-chromate with fish glue, which is poured on the plate, and it is important that the plate should at once be dried; it is the use of the solution of bi-chromate with fish glue which causes the result described. I have used it myself, but only as part of a technical education; but I assure you there are cases which have directly come under our notice.

9007. How many out of that 1,500 are actually exposed to this risk?—It would be only a percentage, because there are so many branches embraced in that number. The industry is young, and it is a growing one.

9008. (*Chairman.*) Have you any other chemicals which you use with reference to which you wish to give evidence?—There is a list of dangerous chemicals used in the process engraving, but there is no evidence of serious trouble arising from them. The acid fumes are undoubtedly injurious, though their effects are not of so lengthy a character; and also dusting operations are of a detrimental character; but they can be obviated very easily by having an up draught over the dusting box.

9009. You do not find men being incapacitated for a week or more through using any of these other chemicals, or through dust?—No.

9010. Have you many of your members engaged in work in dark rooms?—(*Mr. Morrow.*) Yes.

9011. Do you find that they are a particularly unhealthy or a healthy body of men?—No, they seem fairly healthy, though they are all a little bit white-faced.

9012. You do not find that they have to be away from their work suffering from anæmia or other diseases attributable to the dark room?—No.

9013. Do you agree to that?—(*Mr. Rauch.*) Yes.

9014. And you also?—(*Mr. Tolhurst.*) Yes.

9015. How many of your members work in the dark rooms?—I have not taken out the numbers. Our membership is increasing, and the number engaged, I should say, would be about thirty.

9016. Would these be men working all day in the dark rooms?—Yes; their business would be in the operating rooms. (*Mr. Morrow.*) But they would not be there all day; they would be coming in and out.

9017. (*Chairman.*) But they would be there a large part of the day?—Yes.

9018. (*Dr. Legge.*) Do you use ammonium sulphide?—The operators use it a little.

9019. Do you notice any ill effects from that at all?—No.

9020. Except, I suppose, that the smell is unpleasant?—Yes.

Mr. Rauch,
Mr. L.
Morrow, and
Mr. F. C.
Tolhurst.

11 Mar. 1907.

THIRTIETH DAY.

Tuesday, 12th March 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).
 Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.
 Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Professor GEORGE MURRAY, M.A., M.D., F.R.C.P., called and examined.

Professor
 G. Murray,
 M.A., M.D.,
 F.R.C.P.
 12 Mar. 1907.

9021. (*Chairman*.) Do you attend on behalf of the North of England United Coal Trade Association?—Yes, I act as consulting physician to that Association.

9022. Are you Professor of Comparative Pathology in the University of Durham and physician to the Royal Victoria Infirmary at Newcastle?—Yes.

9023. Taking first the question of miners' nystagmus, have you had experience of cases of this disease?—Yes, both in the hospital and as consulting physician to the Coalowners' Association.

9024. Are you of opinion that it is an occupational disease?—Yes.

9025. Are miners specially subject to it?—The frequency of the disease is not very great.

9026. Do you find it more among miners than amongst other people?—Only among miners in my own experience. I am speaking, of course, of that special form of nystagmus known as miners' nystagmus.

9027. Do you also have nystagmus in connection with other diseases of the spine and nervous system?—Yes; it is a symptom which occurs in various diseases of the nervous system.

9028. As a rule are you able to diagnose with some certainty miners' nystagmus?—In a great majority of cases, I should say, yes.

9029. Is there a margin of cases in which it is somewhat doubtful?—Yes; I have come across cases in which it has been very difficult to come to a definite conclusion.

9030. With what other disease could it be associated?—In one particular case a man received an injury, and a question was raised as to whether he had not a tumour of the cerebellum, of which it is often a symptom, and in that case it was rather difficult to determine. His own doctor thought he had a tumour of the brain, but as a matter of fact he was suffering from miners' nystagmus plus certain results of his injury.

9031. Those cases, I presume, are very rare?—Yes, they are uncommon.

9032. In the vast majority of cases of miners' nystagmus is the fact that it is miners' nystagmus fairly certain?—Yes.

9033. The number of cases in different collieries varies considerably, does it not?—That is so. In coming to that conclusion one must allow a certain amount for perhaps the difference in certain colliery surgeons. Some of them seem to be able to detect it perhaps more readily, and are more on the look-out for it than others. For instance, at one colliery one surgeon says that he does not come across it, whereas another surgeon to the same colliery says he sees several cases every year.

9034. Do you think that the lighting of the collieries has any effect on the disease?—I should think that that would be a contributing cause; but undoubtedly the primary cause is the eye strain under which the miner works. That is an expression of opinion.

9035. If a miner suffering from nystagmus is away from his work for some time and is regarded as cured, do you think the nystagmus is likely to return if he resumes working in a mine?—That depends rather upon what stage the disease is taken at. If it is recognised

very early, and the man works on the surface for, say, six months or a year, he will probably recover; then the risk of relapse is small. But I think if the disease has gone on for a long period and then he recovers, the danger of a relapse is greater; and one's usual advice to a man is to give up underground work altogether if possible.

9036. Can you give any idea of the percentage of miners in your district affected with nystagmus?—I am afraid I have no figures to go by.

9037. Would it be less than 5 per cent., do you think?—I should say less than 5 per cent.; I do not know that I could get much nearer than that.

9038. (*Professor Allbutt*.) From evidence which we have heard, and which I think you support, it appears that there is no direct relation between the amount of nystagmus and the degree of incapacity?—Not necessarily.

9039. It cannot be expressed as a direct relation?—No.

9040. That is to say, you cannot say the more the nystagmus the more the man is incapacitated?—No, I do not think one can say that.

9041. You cannot, for instance, translate what you see in a man's eye into the terms of his working capacity?—No; one may see a man with well-marked nystagmus of which he is unaware himself.

9042. Therefore you have to rely really, as regards the headache, giddiness, and impairment of vision, on the man's own testimony?—Yes.

9043. Do you think a man in whom nystagmus had been very evident for some time, but who had hitherto made no complaint, might suddenly begin to suffer from headache, giddiness, and impairment of vision, or is he a tough sort of man who never would suffer thus?—I should say he would be apt to develop those symptoms.

9044. So that we are brought again to depend entirely upon his own testimony; and if a man is disposed to malingering in nystagmus it would be very difficult to disprove his assertions?—Yes.

9045. As regards the prevalence of the disease in various collieries, do you think that the thickness of the seams makes much difference?—We tried to come to some conclusion about that, but we could get no facts. They seemed to point a little way to the fact of the thinner seams being a little more the cause of the disease.

9046. So that there would be nothing in that to help you much?—No.

9047. Can you help the Committee to decide whence the headache, giddiness, and impairment of vision come, seeing that they are not constant? Might it be due, for instance, to some co-operating neurasthenia?—I think that is quite possible. In some cases I have seen it associated with miner's nystagmus.

9048. Is neurasthenia common among colliers?—Do you mean spontaneous, so to speak, or after an accident?

9049. Apart from accident is it prevalent among colliers?—I should say it was. I see a number of cases.

9050. (*Dr. Legge*.) In those cases where you notice that a man has got marked nystagmus, but who has not

complained of the symptoms of headache, giddiness, and impairment of vision, do you think it is desirable that the man should be suspended from work?—Yes; I should say that is the right treatment for it.

9051. Are any steps taken to suspend men who show nystagmus without complaining of the symptoms?—I think, as a rule, not. If a man makes no complaint he does not come under medical supervision; in fact, some men if they know of it rather hide it and do not complain of it.

9052. Colliers who would be suspended in that way would not be incapacitated in any way from work of a different kind, would they?—No; they could quite well, many of them, do good work on the surface.

9053. Is there plenty of choice of work for them above ground?—That is always a great difficulty in mining districts. One often sees cases where they are incapacitated from hewing coal but are capable of doing lighter work; but there are very few situations open to them; it is practically full work or no work; and if a man has work above ground he receives a much smaller wage, so that there are very few situations open for them.

9054. Nevertheless, are you of opinion that those who show marked nystagmus, even without complaining of symptoms, should be suspended?—They should, speaking from a medical point of view, to prevent the disease going any further.

9055. (*Professor Allbutt.*) Why?—Because I think that at a later stage they very likely would be incapacitated by the development of further symptoms.

9056. (*Chairman.*) What form does the disease take if it reaches its utmost severity?—A man complains of the symptoms of giddiness, he is apt to stumble sometimes, and objects may appear to move, and he may have a difficulty in seeing in badly illuminated places.

9057. And he would be prevented doing any kind of work, would he?—No; he could work in a good light, on the surface.

9058. Do you ever get the disease going so far that a man becomes almost blind?—No, I have never seen that. Then I take it he would be in a position to claim compensation for being prevented doing his work underground.

9059. Do you think it would be difficult to check a man's statement if he said that he was incapacitated from working by nystagmus?—Very difficult. I think it would depend almost entirely on his description of his subjective sensations.

9060. (*Professor Allbutt.*) That is, we have mere nystagmus and nystagmus plus subjective symptoms?—Yes.

9061. On suspension, might a man lose his subjective symptoms, and although the nystagmus—which I suppose is incurable in itself, is it not?—No; it is curable if taken early.

9062. By rest, he might get cured of the subjective symptoms, and become capable of working again, although the nystagmus continued?—Yes; but I take it his own doctor would advise him to remain on the surface so long as nystagmus remained.

9063. Even though he might have ground for supposing the man's nervous system was restored?—Yes.

9064. (*Chairman.*) Is it possible to imitate the symptoms of nystagmus?—It has been done, I believe, in one or two instances, but it is so exceptional and so difficult to do, that I think you may count that as being quite out of the question. Might I call attention to the great difficulty in fixing the length of time of work which produces this disease. Apparently, as far as I know, it does not develop under several years' work underground, probably not under five years as a minimum, and there is great difficulty in fixing the responsibility of what period of work has brought it on if a man has worked for different employers.

9065. Do you think five years is a minimum period?—Yes, speaking roughly. I should say that in some cases a man may work for ten years before showing any symptoms at all.

9066. (*Professor Allbutt.*) If a man becomes subject quickly to nystagmus, do you think he is more likely to have the subjective symptoms?—I should say, yes, as a matter of opinion only.

9067. If a man did not suffer from nystagmus for a long time after his entering upon the occupation of a

collier, it would be an argument so far, perhaps, against his being likely to have the subjective symptoms. Let us suppose a man to have been fifteen or twenty years at work before the nystagmus appeared, other things being equal, would he be less likely to have subjective symptoms than a man who contracted it after five years' occupation?—I could not say that.

9068. You have no practical guide as to that?—No.

9069. (*Chairman.*) With reference to the inhalation of gases, we can put aside, of course, cases in which accidents occur, in which there has been sudden poisoning; but with regard to gradual poisoning by carbon monoxide or any other gas in a mine, have you had many cases under your notice?—I have not seen that occur. I cannot say that I have seen any results from repeated inhalation of small doses of gas.

9070. Do you know whether they occur; have you ever heard of them at all?—Practically I do not think they occur. Carbon monoxide is not ordinarily present in a mine; it is only after an explosion.

9071. If the ventilation is defective, and the men breathe foul air, do you ever get cases of men who suffer from illness and are incapacitated from work?—It is quite of short duration.

9072. Does it ever last for a week?—No, I never saw it.

9073. (*Mr. Cunynghame.*) If you include chronic monoxide poisoning, people working in a factory or room where there was gas might claim also. Milliners, for instance, working in a room where there was gas burning at night, might also suffer in the same way, I suppose?—Yes.

9074. Taking chronic monoxide poisoning, would a miner be more exposed to that danger than a milliner?—I should say not so much.

9075. (*Dr. Legge.*) The symptoms you describe as "loss of colour, weakness, and giddiness" suggest that possibly in some of those cases the men were handling explosives of Roburite or negro powder or some other powder. Do you know if those powders are used in your district at all?—Yes, Roburite, I think is.

9076. It contains dinitro benzol, does it not?—Yes.

9077. Have you ever come across cases showing symptoms of dinitro-benzol poisoning?—No; in fact, I have only seen one or two cases where the men have attributed their symptoms to inhaling fumes, but investigation has proved it to be some ordinary complaint.

9078. Do you notice any change in the lips, for instance, and instead of their being red they are blue or ashen grey?—No, I have seen no such cases.

9079. (*Chairman.*) With regard to phthisis, have you many cases of fibrosis of the lungs in your district?—I should say none now, no true case of what is called miners' phthisis.

9080. Used it to be at all prevalent in Northumberland and Durham?—Practically, I think, never at all prevalent. Cases used to occur I believe, but certainly before my day.

9081. You have never come across any cases?—No, I have never seen a case of real miners' fibrosis of the lung. One's experience is that coal dust does not cause fibrosis of the lung. It is not an irritating dust at all; it is quite different from stone dust.

9082. I believe you have some statistics you would like to place before the Committee?—Yes. I want to point out how remarkably free miners in our coalfield are from phthisis of any kind. In Dr. Tatham's table for 1897, taking the mortality of males occupied, the figure for phthisis is 100, and among coalminers of Northumberland and Durham it is only 51.

9083. What is the figure for respiratory diseases?—From an article also written by Dr. Tatham, the mortality in Northumberland and Durham was 94, as compared with 115 among farm labourers.

9084. And how many in occupied males generally?—221. So that miners are remarkably free from tubercular phthisis—which is the only kind of phthisis we see in miners with us. I may mention that it seems to me that in the question of "miners' phthisis" a difficulty is created by using the word "miners" without defining the particular kind of mining. For instance, in Cornwall the disease is due to the inhalation of stone dust, a very different thing to the inhalation of coal dust.

9085. Are the coal seams clean coal in your dis-

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strict, or is there stone mixed with them at all?—I should say as a rule they are clean coal; certainly clean from a surgical point of view, because if the coal dust gets into a wound it does not contaminate it in any way.

9086. The men are not working in stone dust as well as coal dust?—Only to a very small degree, practically not at all, I should say.

9087. (Mr. Cunynghame.) Do you know anything about ganister phthisis?—No, I have not come across that.

9088. (Chairman.) With regard to beat hand and beat knee, have you had experience of cases of those diseases?—Those are two things which, personally, I do not see very much of; they come directly under the notice of the colliery surgeons.

9089. Do you think it is difficult to diagnose them?—It is not difficult to diagnose them, but the occupation of a miner is not the only cause. A man might contract it by using a spade in his garden, and it might be contracted by rowing a boat; a man gets a blister, it bursts, he gets it infected, and acute inflammation occurs.

9090. About what proportion of beat hand among colliers should you say was due to their occupation?—I should say a large majority.

9091. It would be only a small minority which would be due to gardening, for instance?—Yes.

9092. Could you tell me the result of any inquiry into any cases of beat hand and beat knee?—Seventy-six reports were received from sixty-two collieries in the county of Durham, and in thirty-one beat hand was stated to be of frequent occurrence, in thirty-three to be fairly common or occasional, and in twelve to be rare. In no case was the condition unknown. In twenty reports of beat knee it was stated to be unknown and in twenty-four to be rare. In twenty-one it was found to be fairly common or occasional, and in only eleven was it stated to be frequent in occurrence. The true beat knee is practically an inflamed bursa, analogous with the condition known as housemaid's knee. The bursa becomes enlarged from kneeling, and may

become inflamed. A man may get a small piece of coal into his knee and get inflammation, but that, I believe, might be called an accident.

9093. Do you ever get cases of beat elbow?—I should say myself that they did occur, but I think some of the other witnesses are more familiar with the matter than I am.

9094. (Dr. Legge.) Is beat hand due to contraction?—No, it is a more acute condition; it is practically an acute septic inflammation. Men who have been off work for some time and go back to work are apt to get a blister, and it may get infected with dust or dirt.

9095. Is that the universally accepted view of it in your district?—It is a question of degree; there are some cases, I believe, which are looked upon as chronic.

9096. But there must be a suppurative inflammation to begin with, in your opinion?—Yes.

9097. (Chairman.) Do the hands always suppurate?—As a result of the inflammation practically there would be suppuration, yes.

9098. But it would be beat hand if it did not suppurate, I suppose?—Yes, there might be simple inflammation; there are many degrees of it.

9099. (Mr. Cunynghame.) Then it is not acute unless there is some infection; it is a microbe, is it?—Yes; the microbes are probably on the man's hand.

9100. Engineers get the same thing, I suppose, do they not?—Yes.

9101-2. They get inflamed wounds from oil, and so on?—Yes.

9103. (Dr. Legge.) Supposing it were Dupuytren's contraction, do you think that should be regarded as beat hand and give rise to claims for compensation?—No, I should say not; I should say that would put it in a different classification. I should say the acute condition might fairly be considered the result of the occupation; the other might be the result of disease.

9104. Would you like to see the word "acute" used in the definition of beat hand?—Yes, I should.

Mr. THOMAS GOODALL NASMYTH, M.D., D.SC., D.P.H., F.R.S.E., called and examined.

Mr. T. G.
Nasmyth,
M.D., D.Sc.,
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9105. (Chairman.) Are you Medical Officer of Health for Fife, Kinross, and Clackmannan-shires?—Yes.

9106. Do you attend here at the request of the Mining Association of Great Britain?—Yes.

9107. Were you for 15 years a colliery surgeon?—Yes, I was colliery surgeon for about 15 years.

9108. Are you Examiner in Public Health of the University of St. Andrews?—Yes.

9109. Do you consider that there is any disease peculiar to the occupation of a coal miner?—No, I do not think there is any peculiar or special disease.

9110. Do you think they suffer specially from any kind of lung trouble?—On the contrary, I think they suffer less than general workmen.

9111. Have you any statistics on that point?—Yes. With regard to pulmonary phthisis, in my second annual report to Fife County Council, written in 1892, I dealt with the subject of phthisis in relation to miners, and wrote as follows:—"Having been engaged in practice for many years in a district very much given to coal mining, I was put in a position of being able to judge if phthisis or any other diseases was specially liable to occur in coal miners, and to obtain all the information possible I prepared statistics for a period of fifteen years, showing the death rates from phthisis in males and females. I also got all the information possible from the numerous benefit societies in the neighbourhood, showing what were the most common forms of illness from which miners suffered, and these, with the information I derived from my daily practice, gave me ample opportunity of judging what connection, if any, existed with the occupation of coal mining and diseases from which coal miners suffered. At the present time I shall deal only with death rates, but before doing so some reference is needed to collateral circumstances, which must be taken into account before coming to any decision in the matter. The parish with regard to which the statistics were calculated contains about 6,401 acres, of which about 56 are under water. The surface alternates with ridges, valleys, and plains,

and the general declination is to the south and east. The contour lines run from 300 to 700 ft. The measures are principally limestone and coal. The soil is generally clay, and is cold and wet, and the whole parish is open and exposed to cold north and east winds." I mention these facts to show that this was a parish which was rather liable from the climate and condition of the soil to phthisis. "The male population is much in excess of the female. In the whole county there were at last census 110 females to every 100 males, while in this parish there were 114 males to every 100 females. The industry of the parish is mainly coal mining, and this explains the preponderance of males over females.

9112. (Professor Albutt.) Is the population of that district especially liable to bronchitis or other respiratory diseases?—Yes, it is. I gave statistics of deaths from phthisis in the parish of Beath, which is a very large mining centre. Briefly the conclusions were for 1876-80, the male phthisis death rate was very low—lower than for females, contrary to other places. The male phthisis death rate was .824, and the female rate .915.

9113. (Chairman.) How many deaths were there?—I do not think I have the numbers. Those are simply rates. From 1881 to 1885 the male death rate was 1.0, and for females 2.097. From 1886 to 1890 the male death rate was 1.1, and the female 2.1. The mean age at death of miners in these three five-year periods were 46.3, 46, and 47. Another table which is appended was significant of the immunity that miners have against phthisis, and showed that from 1876 to 1880 the percentage death amongst miners from phthisis to all other persons was 42 against 57 in the first five years, 22 against 77 in the second, and 18 against 81 in the last. The summary is that from 1876 to 1880 the mean male death rate from phthisis was .8, and for females was .9. For the next five years it was 1 for males, 2 for females, and for the third five years it was 1.6, against 2.1, showing that phthisis, according to general experience amongst miners was very much less than amongst the females.

9114. At the census of 1871 there were only 1,900 males and 1,600 females in the parish?—Yes.

9115. Therefore if two people died of phthisis among the males, it would be a death rate of 1 per 1,000?—It is calculated per thousand.

9116. If in any given year two people died you would have a death rate of 1 per 1,000 males, and if three happened you would immediately increase your death rate by 50 per cent., because the figures are so small?—Yes, that is so. But I can give you figures drawn over a very much larger area, the Registrar-General's figures for England and Scotland. Those figures are usually calculated for the decade; they were published in 1899, for instance, by Dr. Newsholme, Dr. Ogle, Registrar-General for England, in his report for that year points out that coal miners have a surprisingly low mortality except in South Wales. Then in the last book, that published in 1902, the authors say the exemption of coal miners from a heavy phthisis mortality is specially noteworthy, and is believed to be due to the stringent regulations which have resulted in good ventilation in mines, to the slightly irritant nature of carbon particles, and possibly to an actual deterrent effect of the carbon on the life and activity of the tubercle bacillus. Then Sir John Simon, formerly Medical Officer of the Privy Council, also drew attention to the fact that coal miners enjoyed particularly good health.

9117. Is it your opinion that coal dust is not a lung irritant?—I am perfectly sure about that, because it is not irritant even to an ordinary wound. Colliery surgeons know quite well that extensive wounds full of coal dust heal readily, and they are not followed by tetanus or lockjaw, or any of those nervous affections which are liable to occur in a wound which has been fouled by impure matter.

9118. Have you ever come across a case of fibrosis of the lung in a coal miner?—Thirty years ago we used to see them, but mostly amongst the older men.

9119. Do you attribute the disappearance of the disease to the better ventilation of the mines?—Yes, undoubtedly, and especially by the introduction of fans, and also to the different methods of illumination. They are mostly illuminated now with electricity. They only used to be illuminated by oil lamps, which created a very vitiated atmosphere.

9120. Turning now to beat hand, can you easily diagnose that complaint?—Yes, it is easily diagnosed. I do not know that it is a characteristic disease among miners, because any person who uses a shovel, a pick, or a mallet with soft hands is liable to suffer in the same way.

9121. Do you find it amongst farm labourers?—Yes, amongst any persons with comparatively soft hands; a man who has been off work for a while using a tool where there is a good deal of friction will get it.

9122. Does it occasionally incapacitate a man for more than a week?—I do not think more.

9123. Not for a fortnight?—Not to my recollection.

9124. What do you say as to beat knee?—Strange

to say, I have had no experience of that whatever; I do not know that I ever saw a case of beat knee. I was talking to a Professor of Surgery in Edinburgh the other day, and asked him if he had had any experience of it amongst miners, and he said "No."

9125. Are the seams thin in the collieries in your district?—They are of all kinds. 12 Mar. 1907.

9126. Do the men at their work sometimes have to kneel?—Yes.

9127. And yet they never get beat knee?—I have seen very few cases of it.

9128. You have seen some cases?—I have, but it is not at all common.

9129. How long would that incapacitate, if it occurred, at the most?—A severe case might keep a man off work for a fortnight.

9130. Do you ever have cases of beat elbow?—No, I have not seen many cases. Now and again you see it, caused more by a man hitting his elbow rather than by resting on it. I do not think in our district they have to lie so much on the side as they have in other places.

9131. (Dr. Legge.) Are all the cases of beat hand acute that you have seen, or do you know of a chronic form?—I do not know of a chronic form.

9132. (Chairman.) With reference to nystagmus, have you come across many cases of that in miners?—You see it occasionally, but I do not think it is so common as it was. I think, with better illumination it is not so common, but it certainly does occur amongst miners.

9133. Does it incapacitate them from working altogether?—No.

9134. Does it never incapacitate them?—Not in my experience. It may be worse in places in England, but from my personal experience I have never seen a man incapacitated from work by it.

9135. If a man comes to you suffering from nystagmus, do you order him not to work at mining?—I am entirely out of practice now. I am Medical Officer of Health, and have no practice, so I cannot speak as to that, but I certainly know if he goes off work for a certain length of time the man gets better.

9136. (Mr. Cunynghame.) Nystagmus is a disease, is it not, that takes a good many years to acquire—perhaps twelve or fourteen years?—Yes, a man may be employed years before it comes on.

9137. The disease is the effect of a good many years' occupation, and not a thing rapidly acquired?—No, it is sometimes congenital, and occurs amongst rickety children and people suffering from brain affections.

9138. (Professor Albutt.) But that would not be miners' nystagmus, would it?—It would not, and the difficulty then would be to discriminate between miners' nystagmus and that which was congenital.

9139. But surely the history of the case would guide one?—Yes, but I suspect the miner in such a case would want to be associated with his occupation.

Mr. T. G. Nasmith,
M.D., D.Sc.,
D.P.H.,
F.R.S.E.

Mr. ANDREW SMITH, M.D., called, and examined.

9140. (Chairman.) Do you attend here at the request of the North of England United Coal Trade Association?—Yes.

9141. Are you in medical practice now?—Yes.

9142. Whereabouts?—At Whickham, in the County of Durham, four miles from Newcastle.

9143. Have you had long experience as a colliery doctor?—Yes, and I am still doctor for several collieries.

9144. Have you ever come across cases in which men suffer from gradual poisoning from gases?—No, never at all; I have never met with a case in which a man has been really disabled from chronic poisoning.

9145. Not even for a period of a week?—No. I may say that now colliery managers are very strict in requiring medical certificates when a man is off work for even a few days. I keep a counterfoil of the certificates, and I do not think I have ever in all my experience written a certificate to the effect that a man is off work owing to chronic gas poisoning.

9146. Do you find cases in which the men repre-

sent themselves to be suffering from it?—Very rarely; they sometimes come complaining of general symptoms of debility and general malaise, and say they have been partially poisoned, generally owing, however, to the ventilation not being all right.

9147. What has been your judgment in those cases?—You certainly could not prove it; it would be just as easily explained by errors of diet or other things—dyspepsia, and so forth.

9148. With reference to miners' phthisis, have you had cases under your observation?—Only the one mentioned in the report, which I have handed in, which occurred twenty-five years ago. The man was elderly, he had worked in the mines all his days, and presumably at a time when the mines were less thoroughly ventilated than they are now. That is the only case of phthisis, as distinguished from ordinary tubercular phthisis, that I have met with in all my experience.

9149. Have you made any post-mortem examinations of the bodies of miners who have died of phthisis?—No, I do not think I can say that I have.

9150. Do you regard a case as tubercular phthisis

Mr. A. Smith, M.D.

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simply in which tubercle is present, but in which there may have been fibrosis also, and fibrosis as an antecedent condition?—I think one could always detect cases of fibrosis as distinct from tubercular phthisis, with this exception, that while I have not seen fibrosis among miners, I have seen a fairly large number of cases of true fibrosis, and in nearly all those cases when the sputum has been examined tubercular bacilli have been found.

9151. Nevertheless, you would regard it as a case of fibrosis?—Yes, I believe nearly all cases of fibrosis become tubercular.

9152. In what occupations have you met with it?—The last case I had was a man whose occupation was drilling holes in brass and steel at Elswick Works. He caught tubercular fibrosis, limited to one lung, but the report from the College on the sputum I sent was: "A few tubercle bacilli." That man was at once knocked off work, and practically recovered, but now he is beginning to get rather ill again, I believe from the tubercular affection.

9153. Do you consider that fibrosis in miners is much rarer than it used to be?—It practically never occurs in my experience.

9154. You say practically; what do you mean exactly by that?—It absolutely never occurs, which means that I have no man suffering from a true fibrosis in mind.

9155. Do you find the death rate from phthisis among colliers less or more than it is among the rest of the population?—Distinctly less. In a colliery population it is less among males than among females.

9156. Do you think that miners suffer at all from other diseases of the respiratory system?—Not out of proportion to other workmen.

9157. Do you think that coal dust is not a lung irritant?—I do not think so; in fact, I should be inclined, from my experience, to say that it has really the opposite effect, judging by the experience we have in the treatment of wounds inflicted in collieries. They heal remarkably well, scalp wound especially of the most severe character; even lacerated wounds one has no hesitation in stitching up, and they nearly always heal rapidly. There is a non-liability to irritation, and coal dust seems rather to act as an antiseptic.

9158. Do the miners in your district, in getting the coal, have to drill or hew into rock as well?—I do not know; I think there is a special class of men—stone men—who do that apart from the miners, but of course that will come under mining.

9159. They would inhale particles of stone, I suppose?—I do not know that there is so very much stone, but I have not been down a pit much; I believe it is more clay.

9160. You do not find any forms of lung irritation among that class of men?—No.

9161. (Mr. Cunynghame.) You said there was a man who had phthisis from dust from drilling. I do not quite understand how dust can be produced by drilling?—I do not quite understand it.

9162. Then you do not commit yourself to drilling being the cause, do you, because it does not produce dust?—Quite so; it means this, that I got a case of fibroid phthisis, which, on the whole, is rare; I investigated the case, the man explained to me the nature of his work, and told me there was a good deal of dust in his occupation.

9163. (Dr. Legge.) In that particular case did you find the diagnosis easy?—Quite.

9164. And if you had a large number of such cases would you consider in a different way from that of miners' phthisis the question of including them within the schedule of the Act?—I think fibrosis of the lung of that kind, produced by the irritation of, say, metallic dust would be quite easily distinguished, and would be certainly an industrial disease, having regard to the nature of the work in connection with metallic dust or irritating dust of that kind, but, as I say, in most of the cases, as they advance they become infected with tubercle.

9165. The man you saw, who was affected with a little tubercle, was affected the first time you saw him, I suppose?—Yes, still I had no doubt myself that the essential disease in that lung was the fibrosis—the fine crepitation over a large area of the lung.

9166. Had you ever seen any post-mortem on a case of fibrosis of the lung?—Yes.

9167. Where was that?—I have seen it in my own practice occurring after a bad case of pleurisy. I remember making one post-mortem in which the lung tissue was to a very large extent replaced by a development of fibroid tissue.

9168. Did you see cases, when a student in Edinburgh, of fibrosis of the lungs, which helped you to diagnose this particular case?—Yes, I think so.

9169. (Chairman.) With reference to nystagmus, have you come across some cases of that among miners?—Yes.

9170. Are they frequent?—No, I see about two or three a year. I tried to make an estimate, and I think I gave a figure in my proof. As far as I could make out, I reckon quite 0·2 or 0·3 per cent. of the miners engaged in the work suffer from nystagmus.

9171. Sufficient to require them to have medical treatment?—Yes.

9172. But I suppose there are a very considerable number of men who suffer more or less slightly from it who do not come to a doctor?—That is a doubtful point, and one cannot speak as to that.

9173. Do you think any difficulty would arise in distinguishing miner's nystagmus from other forms of nystagmus?—No, I do not think so.

9174. If you knew the history of the case you could tell it?—Yes.

9175. Do you regard it as an industrial disease?—Yes, I should call that essentially an industrial disease.

9176. Do you consider that it would be difficult to tell whether a man was really incapacitated or not?—I should take up this position. I am only speaking as the doctor consulted, and if a man came to me and I discovered either from symptoms or examining his eyes that he has nystagmus, even in the slightest degree, which I believed to be miner's nystagmus, I would consider it my duty as his medical adviser to urge him to cease work at once, not because he could not go on with it, but because I know he would probably get worse, although he might feel quite capable of carrying on his work, and feel no inconvenience from it.

9177. Is that your practice now?—Yes.

9178. What would happen if he did get worse?—The nystagmus would simply go on getting worse, and sooner or later he would become incapacitated.

9179. From any kind of employment?—It might be if it were allowed to continue.

9180. What would be the symptoms in the worst case you have ever come across, or are they always cured?—Generally, but I have seen cases fairly evident in which the man complained not of defect of vision in the true sense, but giddiness, and a feeling as if the objects he was looking at were moving. He has no personal feeling of the movement in his eye, but objects he is looking at appear to be moving.

9181. Do you think the symptoms could be simulated?—The symptoms might, but the movement of the eye, which you can detect for yourself, cannot.

9182. If a man is apparently cured and goes back to work in a mine is he liable to relapse?—That is the general opinion, but I have known cases taken early in which a man has gone back to work after an interval of six to twelve months, and I have not found a relapse, or at all events, a relapse to the extent that he could not continue his work. I know men now who are working as regular coal hewers who were under treatment for nystagmus five or six years ago.

9183. Are they now quite well?—They are doing their work. They do not come back to me, so I cannot guarantee that a careful examination would not reveal nystagmus, but certainly I can say they have recovered sufficiently to resume work, and remain in health.

9184. How long a period does it take for a man to develop nystagmus?—I do not know that I have seen any case under 30 years of age, and as most of the miners that we have have commenced work in the mines as boys, I should say, at all events, a minimum of five or six years, and very few cases under ten years' work in the mines.

9185. (Mr. Cunynghame.) Then according to your view it would be impossible for a man to malingere nystagmus?—I should think so.

9186. (*Professor Albutt.*) He could not malingering the nystagmus, but he might malingering the incapacity, I suppose?—Yes.

9187. Is there any direct relation between the degree of the nystagmus and the consequent incapacity?—No, I do not think there is, it comes on very gradually. I am afraid in most cases of nystagmus the incapacity is caused by the advice of the doctor.

9188. In what percentage of cases of nystagmus is there also an incapacity for work?—I do not think I have actually incapacitated a man from work as medical adviser for more than a week or ten days at any time, but that is, of course, because I have always changed his work, or always advised him to get work above ground.

9189. Incapacity is not invariable, is it, even in bad cases of nystagmus?—No.

9190. Can you give the Committee any idea of the percentage of incapacity in definite cases?—If you mean incapacity from regular work as a coal hewer, I should say a fourth part of the cases that one sees would not be able to resume coal hewing again, but then we make them incapable because we think it would be to their detriment to continue at that kind of work.

9191. From the workmen's point of view, if one in four of cases of nystagmus is accompanied by incapacity, is it quite equitable, do you think, to the three who would not become incapacitated to be ordered off work?—They are practically all capable of other work in the mine.

9192. At much lower wages?—Yes, presumably so—working on the bank.

9193. Might not you be too solicitous?—You mean you might allow them to continue at work?

9194. Yes. Do you think you have any criterion by which you yourself can form an opinion whether a man is not merely nystagmic, but is also incapacitated, or must you go entirely by his subjective symptoms?—I am afraid I have not gone so much through the subjective symptoms, because, honestly, a good many men have been very much distressed when they have been told they should cease their work, feeling that they are not incapacitated from doing it. But these are cases in which, after going to work at another form of employment on the bank for a matter of six months, they have been able to resume the coal hewing, and have continued at that coal hewing, to my knowledge, for four or five years, without again coming under treatment.

9195. What would be the effect of giving compensation, do you think?—If compensation were paid for nystagmus it is not likely that men who are incapacitated by the doctor in the early stages, and who apparently recover, would care to resume coal hewing again while the recovery might be complete.

9196. (*Chairman.*) What is your experience with regard to recoveries from nystagmus?—That when taken at an early stage, from six to twelve months cessation of underground work results in such complete recovery that coal hewing can be resumed.

9197. Have you had many cases of that kind within your knowledge?—I have had a number of cases. If you think we see only two or three cases in a year, going back twenty years one does not see a very large number, but I have seen a fair number of cases in which recovery has been so complete that the men have been able to resume work.

9198. (*Professor Albutt.*) Miners' nystagmus alone causes a very modified disability, does it?—When I used the word "modified," I mean it may cause disability from coal hewing, but not disability from other work at the colliery.

9199. (*Dr. Legge.*) Can you tell us how many men you suspend in the way you describe every year?—Do you mean advised them to cease coal hewing and get other work?

9200. Yes?—Two a year.

9201. (*Mr. Cunynghame.*) Out of how many?—Out of 600, I should think.

9202. (*Dr. Legge.*) Do you think, from conversation with other medical men in the district, that what you do might be interpreted as their action also?—Yes, I should think so.

9203. (*Mr. Cunynghame.*) Do you think the number of cases would be increased if compensation was given?—Yes, that is probable.

9204. What would the figure 2 out of 600 become then?—I do not think it would be increased under those conditions if they do not come knowing they have nystagmus. It is we who find it out.

9205. But still they might come knowing a little more if it became a scheduled disease, might they not?—Quite so.

9206. But you do not think it would become a formidable number, I understand?—I do not. The milder forms of nystagmus are often unquestionably not detected unless one is on the look-out for them. You do not always get the cases in the early stage, but recovery would be almost certain in a short time, and there is a very great difference in the diagnostic skill of the doctors consulted with regard to the disease. You will find practising in the same district one man say he will see two or three cases out of 500 or 600 men, and another doctor will say "I have never seen nystagmus." The fact is they do not look for it.

9207. When a man recovers and goes back he is nearly sure to get it again, is he not?—Yes; but, as I tell you, I have met with a very fair proportion of cases in which it has not returned.

9208. (*Chairman.*) Do you have many cases of beat hand come to you?—Yes, that is quite common.

9209. Is the diagnosis of that quite easy?—Quite.

9210. How long does the disability last?—If diagnosed promptly it might recover in a few days simply with rest. If it has gone another stage, and suppuration has really commenced, prompt treatment again will probably get the disability over in a week or ten days. It is only when it is allowed to fully develop that you get serious mischief from it.

9211. Have you had any cases in your knowledge in which compensation has been paid under the Workmen's Compensation Act for beat hand?—Yes.

9212. Where it has been regarded as an accident?—Yes.

9213. Has there not been a recent case in the Law Courts in which it was decided not to be an accident?—Yes, I believe so.

9214. With regard to beat knee, do you have many cases?—No, they are very rare.

9215. But cases do occasionally occur?—Occasionally.

9216. And beat elbow?—Yes, I have met with it more often than beat knee, but they have always been regarded as accidents to the elbow from knocking against the side in the work.

9217. Do you never have a case of a man who has been working in a very confined position, and by continually knocking his elbow, gradually contracting this affection?—No, I do not think so; there has generally been an accident associated with the cases I have seen.

9218. Does "generally" imply always?—It amounts to that. It has always been regarded as an accident. The men in such cases have reported to their deputy, and the certificate I have given is that they are suffering from suppuration of the elbow (we do not call it beat elbow), and compensation has been invariably paid by the collieries I have had to do with.

9219. Is beat elbow always accompanied by suppuration?—Yes.

9220. Is there any less colloquial term than beat hand, beat knee, and beat elbow which would describe these ailments?—Bursitis of the knee and elbow, and septic inflammation or suppuration of the palm of the hand.

9221. Is suppuration an invariable symptom of beat hand?—Of a developed beat hand, but if taken at a very early stage recovery may take place without suppuration—it means that the inflammation which should otherwise end in suppuration has been arrested.

9222. Might not you get a case of a man suffering from beat hand for a fortnight, say, without suppuration?—No.

9223. Never?—No.

9224. (*Dr. Legge.*) Do you get cases of chronic contractions of the hand?—No.

Mr. A.
Smith, M.D.

12 Mar. 1907.

Mr. ARNOLD JAMES GREENE, M.B.C.S., L.R.C.P., called, and examined.

Mr. A. J. Greene, M.B.C.S., L.R.C.P.

12 Mar. 1907.

9225. (Chairman.) Do you attend here at the request of the Mining Association of Great Britain?—I do.

9226. Are you surgeon at the Wigan Infirmary?—I am Assistant Honorary Surgeon.

9227. And Medical Adviser to the Northern Employers' Mutual Indemnity Company?—Yes.

9228. Have you had many cases, or any cases, under your notice of chronic poisoning amongst miners by gases?—No, I have never seen a case of chronic monoxide poisoning.

9229. Or by any other gas or bad air in mines?—No; not a chronic case.

9230. Have you any reason to think such cases occur?—No, not at all.

9231. With regard to fibrosis of the lungs, have you come across any such cases amongst coal miners?—No, I have never seen a case.

9232. Have you amongst any other classes of work-people?—No, I have never seen a case of chronic fibrosis.

9233. Have you attended any ganister miners or potters?—No, I have not.

9234. With reference to nystagmus, is that in your opinion an industrial disease?—Yes, I think it is.

9235. Is there any difficulty which you would wish to draw the attention of the Committee to if this disease were scheduled for the purposes of compensation?—The difficulty would be in knowing in which employ a man got the disease. It takes some years to develop, and he might get it in one employment, and go to another; there he might be getting better by working under different conditions, but it might be found out, and then he would claim compensation for it, no matter where he contracted it.

9236. How long do you think it takes to develop nystagmus?—Years; I could not say the time, but over five years.

9237. Have you ever had cases of men suffering from nystagmus who, after working for some time in the open, have been cured, and then have gone to work again as coal miners, and have not had any relapse?—I have seen cases where the men get very much better, but we always say if a man has had miner's nystagmus he should not go down the pit again. But they do go down again.

9238. If they do go down again, do they invariably get worse?—Under similar conditions they get worse again.

9239. Do not you have cases of men who recover by abstention from employment in the mines?—The objective symptoms may disappear, but whether they come back again by going down the pit in every case I do not know; I should say they would, without a doubt.

9240. They always do, do they?—I would not say always, but generally.

9241. What do you consider are the symptoms of miner's beat knee?—Beat knee, I take it, is a chronic bursitis, which is the ordinary miner's knee, but then you might get another condition, that is an acute condition brought about by a scratch or poisoning. I think the two things should be separated.

9242. With regard to beat hand, what symptoms do you get?—Practically the same as in beat knee.

9243. Have you ever had any cases under your notice of beat elbow?—Yes, I have.

9244. Are the symptoms there the same?—Just the same.

9245. In your opinion, does beat elbow arise from accident, or may it arise gradually from continuous employment?—It may arise in both ways. First of all you may get a chronic bursitis from continuous pressure; secondly, you may get this chronic condition acutely inflamed from injury; or without the chronic condition in the first instance you may get an acute beat elbow, beat hand, or beat knee, as the case may be, from injury followed by septic poisoning.

9246. You would not say that every case of beat elbow was necessarily the result of an accident, would you?—No, I should not. I think there are two conditions, one is chronic, the result of continuous pressure,

and the other may be due to an accident in which a scratch admits bacillus, and sets up inflammation.

9247. Do you ever get cases amongst miners of dilation of the heart?—No, I do not within the meaning of this inquiry. Of course, you may get enlarged heart in any man of over 40 years of age.

9248. What is your general view with regard to scheduling this disease under the Workmen's Compensation Act?—I think the occupation should be scheduled with the diseases, and if that is not done I think there will be a lot of litigation.

9249. (Mr. Cunynghame.) At what age does a miner generally become unfit for work, and discontinue it?—It varies a great deal. I have seen a man working in the collieries 80 years of age, and there are many working at 70.

9250. What is the average?—I should think 60 years of age.

9251. Then from a pecuniary point of view, it would be rather an advantage for a man to get nystagmus in his 59th year, would it not, because he would get £1 a week, being the difference between what he could earn below ground and what he could earn above, and he would retain that sum?—Yes, it would be practically a pension for him.

9252. (Professor Allbutt.) You have published already the evidence you have given us to-day, I think, have you not?—Yes, I sent it to the "Lancet."

9253. You say you have never seen any cases of chronic monoxide poisoning?—No.

9254. And that it is open for anyone who might be brought in contact occasionally with small quantities of this gas, to say that he was suffering from chronic carbon monoxide poisoning, although he may be suffering from a drinking bout or some other condition which might bring about a lowered condition of general health?—Yes.

9255. But I understand you have not seen cases?—No.

9256. Then on what ground do you make that statement?—Because those are the recognised symptoms of chronic carbon monoxide poisoning.

9257. But you are not an expert, I understand?—No.

9258. Have you ever seen a case of fibrosis of the lungs and chronic pneumonia?—No.

9259. Then how can you make a very positive assertion that the lines of demarcation are too shadowy to enable one to swear positively; you admit you are not an expert on that subject?—No.

9260. Surely those are strong opinions to publish, in anticipation of this interview, in the "Lancet," by one who is not an expert on the subject, are they not?—Possibly; but nevertheless correct.

9261. (Dr. Legge.) With regard to the treatment of miner's nystagmus, and the prohibition from work below ground of any man who shows symptoms of it, do you know on whose authority that is recommended—who are the ophthalmic authorities who have laid it down that no miner who shows symptoms of nystagmus should go into a pit?—Mr. Lloyd Owen, the Senior Consulting Ophthalmic Surgeon at Birmingham, advises it.

9262. Do you know where he has published the statement?—No, but I have seen him about it, and we have had a report from him.

9263. Do you ever see any chronic contraction of the hands like Dupuytren's contraction in miners?—I have seen one or two cases of Dupuytren's contraction in miners.

9264. Would you call that beat hand?—No, I should not.

9265. Do you think that the process must be acute?—No, it is very chronic.

9266. But to be either beat knee or beat hand, do you think the process must be an acute one?—No, not necessarily. I think chronic bursitis may be beat knee like housemaid's knee; that might be a beat knee, or on the top of it you might get an infective condition, which probably would be more likely due to accident.

I do not quite understand yet whether chronic bursitis is to be called beat knee.

9267. I am asking you whether you think the term acute ought to be applied?—I should call it acute or chronic beat hand or beat knee, as the case might be.

9268. An ordinary housemaid's knee would not incapacitate at all, would it?—No, but a person might claim it did. I have had colliers come to me with chronic bursitis who say they cannot work.

9269. But the ordinary housemaid's knee can be cured, can it not, without difficulty?—It can be cured

by excision, but it is apt to recur otherwise, and some colliers will not undergo any operation; they will not let you do anything to them. There is only one certain cure for a chronic bursitis of the knee—i.e., excision. Of course, you can paint them and so reduce them, but they are liable to recur if the men go back to kneeling work. What I wish to say is that there are two forms of beat hand or beat knee, one chronic, which I think is not due to accident, and the other acute, which might be. The chronic form will not prevent a man from working, the acute form does. I should not allow compensation in the first instance, but should in the second.

Mr.
A. J. Greene,
M.R.C.S.
L.R.C.P.

12 Mar. 1907.

Mr. THOMAS RATCLIFFE ELLIS, called and examined.

9270. (Chairman.) Are you a solicitor and Law Clerk and Secretary to the Mining Association of Great Britain?—I am.

9271. Do you attend here on their behalf?—I do.

9272. Have you heard the evidence of the four medical men whom the Committee have examined this morning?—Yes.

9273. Have you anything you wish to add to that evidence with reference to any of these particular diseases?—No, I have nothing to add beyond what I suggest in my proof.

9274. What is your view with regard to the *onus probandi* being placed on the employer in cases of industrial disease?—When the section was first introduced in the Bill the intention was, I think, that an industrial disease should be put on the same footing as an accident for compensation purposes, and that two things were necessary: one was that there should be a certificate given by some official that the man was suffering from the disease, and, in the next place, that it should be proved that it was due to the nature of his employment. Of course, the first would be proved by the certificate, the second by the man himself. As he would have to prove an accident he would have to prove that the disease was due to the nature of his employment. Then in its progress through the House, sub-clause 2 of clause 1 of section 8, was introduced into the Bill, putting on the employer the obligation to disprove that it was the result of his employment if he was suffering from a disease which was opposite in the schedule to the particular process or employment.

9275. My recollection is that that was in the Bill as introduced?—I was under the impression it was not so, but no doubt you are right. Then I think there are diseases, speaking from what I have heard from the medical men, where the very strong presumption is that they are due to the nature of the man's employment. For instance, ankylostomiasis. The obligation to disprove that it is due to the employment should be on the employer. But in other diseases I think it is only fair to the employer that the *onus probandi* should be on the workman, as it would be in the case of an accident. Then I suggest if you cannot alter the section in order to relieve the employer from that obligation, it is a question whether any diseases which may be on the border line should be included in the schedule or excluded. If you can modify the schedule to throw the *onus probandi* on the workman, it would be desirable I suggest to do so, just as in the case of an accident, and that sub-section 2 of section 8 should only apply in cases where it is a thousand chances to one that the disease is not due to the nature of the man's employment.

9276. Do you consider that miners' nystagmus, if it could be proved to exist, is clearly an industrial disease?—I should say, from what I have heard from the doctors, that it is an industrial disease, but the difficulty in applying this section to nystagmus seems to me this: under Section 8, if it can be shown by an employer that the disease has not been contracted altogether whilst the man is in his employment, he should be allowed to bring in for contribution employers who had employed the man within 12 months of the time the disease was discovered. I think it is a very fair principle that the compensation should be distributed amongst all those with whom the man has been employed during the time this disease, which is of gradual process, has been coming on. As you have heard, five years is about the minimum, and it may be a great deal longer time during which nystagmus is developing, and this clause only provides that

any employer within twelve months shall be made partly responsible. If you have power to alter that section, I should ask you to take away that twelve months altogether, and say that any employer with whom any man has been employed during the time the disease has been gradually in process should be brought in for compensation.

9277. Do you consider it would be more to the advantage of employers to have to investigate for whom the man has been working, say, for the previous fifteen or twenty years, and to bring them all in, and to assess the compensation amongst the whole of them rather than for the last employer to pay in each case, and even if he has to pay for a share of the man's incapacity which was really due to another employer, he would, on the other hand, in some cases escape paying a share which he ought to pay in cases of men who have left his employment and gone to someone else. Would not it work pretty fairly all round if the last employer only was made to pay?—With reference to nystagmus, I am afraid the amount of compensation might be very serious. The general opinion seems to be, rightly or wrongly, that if a man suffers from the disease he ought at once to cease working down below. Now, the remuneration for labour on the surface that such a man could do would in all probability be very much less than the amount he would receive if he worked down below. A collier, for instance, would be getting a great deal more than he would in any occupation on the surface, and the result would be that for a man's life he would have to be paid some compensation. According to the Act, if the County Court Judge came to the conclusion he should divide the loss, it would be half the loss, and in other cases the County Court Judge might give him the whole difference, so that it might happen that a young man might have a pension for the rest of his life. Therefore the amount of compensation would be very serious indeed, and I think it ought to be spread over as many people as possible.

9278. From the standpoint of the employers, which do you think would cause less trouble, expense, and complication—the last employer paying in each case, even though he is paying for incapacity which is not due to him, and escaping payment when he has not been the last employer? Would you go back ten, fifteen, or twenty years, tracing out previous employers, divide up the compensation amongst them, and collect varying payments from each employer as the compensation to the man is varied?—It is difficult to say. If a man came from another district the probability is he would get no contribution at all. There is a clause in the Act requiring a workman to give information, but where a collier moves from one district to another it would be difficult to get a contribution. There might be cases where men came from abroad. I was rather putting it, if you could not alter the section, to leave the disease out on account of the injustice which might result to an employer from the contributors being limited in number.

9279. (Professor Allbutt.) Do you mean leave nystagmus out?—Yes. I look upon nystagmus as a very serious question if a man ought not to be allowed to work below again. He may be attacked as a young man, and have a long life before him.

9280. (Chairman.) If the Committee decided to include nystagmus, which of the two alternatives which I have put before you do you think your Association would prefer?—If you include nystagmus I think I should prefer it to stop as it is, and not go back beyond the twelve months, because I think the chances of a contribution are so small that it would not be worth while making any alteration.

Mr. T. R.
Ellis.

Mr. T. R.
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9281. And if a given employer loses in some cases he might gain in others?—He might gain in others.

9282. With regard to beat hand and beat knee, what is your view as to their inclusion?—I think those ought to be cases where the onus of proof should be upon the men. One cannot resist the evidence that doctors give, particularly in the North of England, that it is very common amongst colliers, but at the same time I understand that anybody is liable to get it who uses his hands in work of that sort, and therefore it occurs to me that it is a case in which a man should be bound to prove, not only that he had got the beat knee or beat hand, but that it was due to his employment.

9283. With regard to lung diseases, what do you say?—As to those, I think equally it should be proved by the man. I suppose what the doctor would require to know would be the history of the man, not merely the fact that he is in that condition, and I think there ought to be an opportunity of having that inquired into from the man himself. If the employer has to disprove it, the man need not open his mouth at all.

9284. (Mr. Cunynghame.) Is it your view that in coal mines there is any case made out as to miners' phthisis?—None at all. There is another point, which is this, that in the schedule "mining" only is mentioned, and I was going to ask the Committee not to put opposite mining any of those diseases which are in no way incident to coal mining; but that you should say "coal mining," and anything which you think might be incident to coal mining, and put the other diseases against the particular kind of mining which you con-

sider they ought to be placed against. I do not want to have to disprove a case because it happens to be opposite mining which has nothing to do with coal mining.

9285. You mean it is of importance to employers to make it clear, do you?—Yes; and that the only diseases which you considered incident to coal mining should be opposite coal mining.

9286. (Dr. Legge.) Do I gather from you that you would prefer to see the second column as small as it can be made?—I should be glad to have it a little larger, because one classification "mining" will not suffice.

9287. But you would prefer to have the burden of proof thrown on the workmen?—Yes, I would.

9288. (Mr. Cunynghame.) Do I understand, with regard to nystagmus, you admit that the burden might fairly be on the employer?—I think we ought to admit that, unless we can show to the contrary; but in the case of beat knee and beat hand, then I think the miner not only ought to prove that he has it, but that he got it in his employment.

9289. Have you anything to say about chronic carbon monoxide poisoning?—I do not think that ought to be paid for as a disease.

9290. (Dr. Legge.) Do you know that some cases have been published where poisoning from dinitro benzol has been contracted through handling cartridges?—I have heard that said, but I should think that is very exceptional.

THIRTY-FIRST DAY.

Monday, 18th March 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (Chairman).

Mr. HENRY CUNYNGHAME, C.B.
Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (Secretary).

Mr. J. F. W. TATHAM, M.A., M.D., D.P.H., called and examined.

Mr. J. F. W. Tatham, M.A., M.D., D.P.H.
18 Mar. 1907.

9291. (Chairman.) Are you Superintendent of Statistics at the Registrar-General's office?—Yes.

9292-3. Have you lately revised your tables of mortality?—Yes.

9294. When?—In the year 1901.

9295. Have you any new tables which are quite up to date of death rates with respect to occupational mortality?—Yes, I have some tables, but they are not published yet.

9296. Could you give the Committee any figures from those tables?—Yes, if you will tell me exactly what you want.

9297. Can you tell the Committee whether any variations have occurred in the death rate from phthisis generally in different occupations in the first place, and fibroid phthisis in the next place?—I am afraid I must explain. With regard to phthisis generally a great deal is included under that term, which is not tuberculous phthisis. In some parts of the country, at any rate, medical men are probably less careful than they ought to be, and a good deal comes under the term phthisis which, properly, should not be included.

9298. (Professor Allbutt.) After all, the name "phthisis" does not signify much, does it?—Not always.

9299. (Chairman.) As a matter of fact, have you, in your tables of mortality, tables giving the death rate in various occupations from phthisis?—Yes.

9300. What I want to know is whether the more

recent figures have shown any marked variation in any particular occupation in that respect; are there any occupations in which any marked variations have occurred?—I cannot give you the exact figures without reference to the tables, but I shall be glad to supply them to you. I know that there are considerable variations.

9301. What period do the last figures cover?—The years 1900, 1901, and 1902—i.e., the Census year and the years on each side of it.

9302. Your figures, I suppose, are necessarily dependent on the certificates given by medical men of the causes of death?—Quite so.

9303. Therefore if medical men are not careful in distinguishing fibroid phthisis from tubercular phthisis that lack of care would necessarily, would it not, to some extent impair your statistics?—To a very great extent.

9304. Do your latest figures give a separate heading for fibrosis?—Not in respect of occupations; fibrosis comes under "Other diseases of the lung." In the occupational mortality tables the deaths are now classified similarly to what they were 10 years ago. You see under that head "Other diseases of the respiratory system," the tables are repeated and are identical for all the occupations; but, unfortunately, they do not distinguish fibroid phthisis from other forms of lung disease.

9305. Have you noticed any marked variation in the

death rate from diseases of the respiratory system among potters?—It varies from year to year.

9306. You have not noticed any constant tendency in that direction?—Except the tendency for the disease to be very fatal amongst them. It is still very fatal. Of course I shall supply you, with pleasure, with the exact figures.

9307. You have no reason to think that fibrosis of the lung has almost disappeared amongst potters?—No, I should think it has not disappeared.

9308. With regard to coal miners, do you gather from your investigation of the figures which have been placed before you from all parts of the country that that class of men suffer specially from lung diseases?—No, certainly not from phthisis. They suffer from phthisis in something like half the proportion that people generally suffer from it.

9309. By "phthisis" now you mean tubercular phthisis, do you?—Yes, tuberculous phthisis.

9310. Do you ever get returns of fibrosis of the lung among coal miners?—Yes, but we do not abstract them separately, for the reason that the numbers would scarcely justify a separate classification.

9311. Is that because cases of fibrosis are in your opinion very few among coal miners, or because doctors do not or cannot distinguish what is fibrosis and what is tubercular phthisis?—I think your first suggestion would be the correct one—namely, that amongst colliers tuberculous phthisis, and fibroid phthisis, too, are comparatively infrequent diseases.

9312. Turning to tin miners in Cornwall, have you a different state of things?—Yes, there you have a good deal of phthisis.

9313. And fibroid phthisis?—Probably. You see, unfortunately I cannot discriminate between them, because they are not returned separately; but certainly there is phthisis.

9314. Do your tables show the incidence of comparatively rare diseases like glanders?—No, not in combination with occupations. The tables which you have before you for the country generally do show those diseases. That table for 1906, for the whole of England and Wales, gives the details for something like 20 years. The upper portion of that table gives the crude facts; the lower portion gives the rates of mortality, so that the lower portion is much better for purposes of comparison, as you will see.

9315. (*Professor Allbutt.*) Is there a descending rate of mortality among potters from phthisis in recent years?—I have not the figures before me, but my impression is that the mortality amongst potters is somewhat less from phthisis than it was 10 years ago, but I will send you the figures.

9316. (*Dr. Legge.*) Although you include fibroid phthisis under "other respiratory diseases," do you think that the medical men in their certificates generally include it under the term "phthisis"?—I think they do—a great many certainly do, and I have not the slightest doubt either that cases which originate as fibrosis of the lung become tuberculous in time. I fancy you yourself have reported somewhat to the same effect.

9317. Therefore in the table on page 96 of the decennial supplement for 1891-2 the conditions of fibrosis are to be ascertained more from the diseases of the respiratory system than from common phthisis or quite as much?—Probably quite as much.

9318. Will you kindly turn to Table 4 in the Supplement, page 146, No. 18, "Dock labourer and wharf labourer," is it not?—Yes.

9319. The figure for phthisis is 325, bronchitis 286, pneumonia 220. Are not all those figures exceptionally high?—If you take, for instance, all males as your standard you will see that bronchitis, pneumonia, and pleurisy are considerably higher. Will you kindly remember that these are the figures not for 1901-2, but for 1891-2.

9320. But these are the only figures we have at present, are they not?—Yes, but I am going to send you the corresponding figures for the later period.

9321. The conditions in reference to those dock labourers are practically the same as they are with regard to cutlers, are they not?—Yes, but for a very different reason, I should think. The figures as to dock labourers and wharf labourers mean destitution

and misery from non-employment and that sort of thing.

9322. We have had a good deal of evidence with regard to the amount of dust produced in the unloading of cargoes of grain?—Yes, no doubt, but dock labourers, you see, are people who very readily get out of employment, and that accounts for a good deal of their mortality.

9323. But you could not say, could you, that that mortality was not in large measure due to dust, if dusty conditions were present?—Probably it would be so to a certain extent.

9324. Do you include it in the table on page 96, which refers to the effects of breathing dust-laden air?—I do not think so for the reasons that I have stated.

9325. I cannot find in any other occupation that the figures are comparable except those of the cutler and of the scissors grinder?—Dock labourers are not comparable in any sense with cutlers. I take it, it is simply an accident. I do not think the heavy mortality would be due to the same cause. I should feel inclined to think that other circumstances determined it.

9326. Will you mention the various ways in which non-tubercular disease of the lung is described on death certificates?—Yes, anthracosis pulmonum.

9327. Is that a frequent description?—Fairly so. Grinder's asthma, potter's asthma, collier's phthisis, cirrhosis of the lung, chronic interstitial pneumonia, millstone maker's phthisis, miner's phthisis, pneumoconiosis, siderosis, and silicosis. That is a list of the names we find in medical certificates. I wish they could all be reduced to one name. The only way that I know of in which you could obtain really useful information would be by applying to the medical men in charge of people engaged in occupations of this kind. I think I am right in saying that many medical men have a very large practice amongst persons engaged in occupations of this kind, and that they would be able to give you very useful information. In the Returns of the Registrar-General we only deal with deaths, and of course the deaths only form, happily, a small proportion of the sick cases. I should like to get at the sick cases if I could. What is wanted is a register of sickness, and in that way you would get really useful information. I do not think very much can be got from the death figures alone, because, as I say, the deaths form only a small proportion of the cases. Then, again, the deaths may be certified as being due to one disease, but it may be one of several diseases, or a complication of diseases.

9328. But the term pneumoconiosis covers the whole subject of dust, does it not?—Yes, that would mean dust-disease.

9329. But it would also mean anthracosis, I suppose?—Yes, it would.

9330. And that you say, do you, is very rare?—No, I do not say it is very rare, but I say it does not appear so frequently now as it used to do in death certificates. I have no means of judging whether it is rare or not, and therefore I am suggesting that you should go to the medical men who really treat the cases. For instance, supposing a case of fibrosis of the lung, we will say, occurs, the patient is obliged to give up work for a time; he goes home and probably develops some other disease—it may be a tuberculous disease, it may be disease of the kidney, it may be Bright's disease; then the question is, is the medical attendant going to certify the death as pneumoconiosis or fibrosis, or will he call it Bright's disease? It is often a toss up, in my opinion, which he does state, so that our statistics are considerably vitiated in that way. We are obliged to make a selection from among the causes of death.

9331. But if it was a lung disease he would choose phthisis as a term to be adopted, would he not? Do you think phthisis is a word which we ought to try and exclude?—I should like to have it limited to tuberculous phthisis.

9332. Supposing such terms as silicosis and siderosis were used, would they include tubercular affection which supervened on the primary silicosis?—No; if it did, then those terms would be bad; but I should think those terms would be very good indeed to differentiate pneumoconiosis from tuberculous phthisis.

9333. (*Chairman.*) But they would not include anthracosis?—Pneumoconiosis would, but not siderosis.

Mr. J. F. W. Tatham,
M.A., M.D.,
D.P.H.
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Mr. J. F. W. 9334. (*Dr. Legge.*) Do you understand by anthracosis
Tatham, coalminers' phthisis?—Anthracosis simply means the
M.A., M.D., black pigmentation of the lung, not necessarily tuber-
D.P.H. culous.

18 Mar. 1907. 9335. But that would not be a cause of death, would
it?—It occasionally appears so in the death certificates,
and we cannot get behind these.

9336. Therefore it would be right to exclude anthra-
cosis from a schedule of the diseases for which com-
pensation was to be paid, I suppose?—I cannot, I am
afraid, answer that. I have not considered the ques-
tion from that point of view at all.

9337. Supposing tubercular affection were added to
silicosis, it would be a secondary cause, would it not,
to the silicosis?—Certainly; but according to rule,
and we are obliged to lay down some rules for classifica-
tion, in case tuberculous infection occurs it would be
taken in preference to any ordinary lung disease.

9338. (*Professor Allbutt.*) If you substitute the word
"supervenes" for "occurs" would your answer still
stand?—Yes.

9339. (*Chairman.*) The Committee have had a good
deal of evidence to the effect that there is no such
thing as anthracosis from medical men, who say they
have never seen a case of a collier contracting any form
of phthisis from the inflammation set up by coal dust,
and that coal dust is not a lung irritant. Would the
fact that anthracosis appears in your statistics imply
that officially you are of opinion that disease may be
contracted from the inhalation of coal dust?—Disease
certainly, but I should think not often tuberculous
phthisis; tuberculous phthisis is relatively rare amongst
the coal miners.

9340. Then what disease would be contracted?—
Bronchitis probably, or some form of irritation of the
air tubes—the result of dusts of various kinds—the
result of the inhalation of those noxious vapours and
gases that are to be found in coal mines.

9341. Would they be entered in any table under the
heading of anthracosis?—No, they would appear under
the particular respiratory disease.

9342. Anthracosis is essentially a form of lung
disease, is it not; it is a name for a special kind of
fibrosis of the lung, is it not?—Yes, it is included under
fibrosis of the lung. When a death from anthracosis
is returned we do refer it to fibroid disease of the lung
for want of a better place.

9343. Have you any information of your own as to
whether or not such a disease as anthracosis—that is
to say, fibrosis of the lung, due to the inhalation of coal
dust—does exist at all, or do you simply accept it from
the medical men who certify death to be due from that
cause?—We simply accept it. I have no opinion to
express on the point, because for many years I have
had no experience of treating the diseases of colliers.

9344. (*Professor Allbutt.*) How does bronchitis stand
in the returns of diseases amongst colliers?—Bronchitis
is rather more fatal amongst colliers than amongst the
population generally, and in that respect it differs
from tuberculous phthisis.

9345. (*Chairman.*) You are going to be good enough
to supply us with more recent figures of occupational
mortality, I understand?—Yes.

9346. Could you discriminate in those figures the
various forms of phthisis other than tubercular of which
you have given a list here?—Not in that degree of
differentiation. What I can do is to give you the
forms of lung disease that appear in the tables—for
instance, bronchitis, pneumonia, and "other diseases
of the lung."

9347. But you cannot give these in non-tubercular
forms of phthisis, can you?—No, they are all lumped
under the head fibrosis or fibroid disease of the lung;
here again for the purposes of the tables concerning

occupational mortality, they are included under the
head "other respiratory diseases."

9348. (*Professor Allbutt.*) Might I suggest that
probably in your opinion all these cases of fibroid
phthisis are sooner or later tuberculous?—Do you mean
to say they do not eventuate in tubercle?

9349. I think they do?—So do I.

9350. In that case, you see, the heading of fibrosis
might get obliterated on your proposal, would it not?—
Yes. I think that some medical men who treat a case
of fibrosis of the lungs, which eventually becomes tuber-
culous, would certify it as such; it would consequently
appear as a death from phthisis; and I believe that a
very large proportion of such cases do become tuber-
culous eventually.

9351. And do you think they ought to be returned as
tuberculous phthisis?—I think so, certainly.

9352. But would you not then lose all record of the
origination of the disease?—I have not the slightest
doubt that the bulk of the cases do come under the
head of phthisis, because medical men call them
phthisis when they get to the last stage.

9353. (*Chairman.*) I notice that in Table 19, under
the heading "Deaths from various causes, at all ages,
1886 to 1905," in the year 1901, phthisis seems to
have been divided into two—"pulmonary tuberculosis"
and "phthisis not otherwise defined"?—Yes.

9354. Previously to that date were they all in one
group of figures?—Yes, and that was an attempt on
my part to distinguish tuberculous phthisis from
phthisis of other kinds.

9355. Do your figures show that the 644 are cases of
phthisis which are not tuberculous, or do they mean
that they are cases in which the medical men have not
troubled to define whether they are or not?—I think
the latter.

9356. (*Dr. Legge.*) Then, I think, in another table
you have actually got the number of cases of fibroid
phthisis returned?—That is so.

9357. (*Professor Allbutt.*) Where a medical man has
been so careful as to define it as fibroid phthisis I should
have thought he might be relied upon?—Yes.

9358. (*Chairman.*) But in your view if tubercle has
supervened it is no longer fibroid?—No, I should
classify it as tuberculous phthisis.

9359. But you say almost all cases of fibroid phthisis
ultimately become tuberculous?—That is my opinion,
and I am glad to be in accord with Professor Allbutt,
who is a much higher authority than I am.

9360. (*Dr. Legge.*) I suppose the term silicosis would
include the bronchitis; that would be associated in the
later stages with it?—Not unless it was certified so.
Bronchitis, as such, would come in our classification
under the head of bronchitis.

9361. (*Chairman.*) But almost all the figures with
regard to fibroid phthisis and other forms of phthisis
are vitiated, in your opinion, by the idiosyncrasy of
the particular medical men who make the returns?—
Quite so.

9362. And no definite conclusion can be drawn from
them?—I think not.

9363. We cannot assume, for instance, where we find
in 1905 a figure of 411 deaths in England and Wales
from fibroid disease of the lung, that there were only
411 people who really died because they had contracted
lung disease from dust?—I think not. I do not think
you would be warranted in assuming that that was
the sum total. I think Dr. Legge, who has had con-
siderable experience in these matters, will tell you
that it is quite possible to get definite information from
the medical men who are actually in charge of people
of this kind.

Mr. JABEZ BOOTH and Mr. NOAH PARKES, called and examined.

Mr. J. Booth 9364. (*Chairman.*) Do you attend here as represent-
and Mr. ing the National Amalgamated Society of Male and
N. Parkes. Female Pottery Workers?—(*Mr. Booth.*) That is so.

9365. Of which you are the organisers?—Quite so.

9366. Have you worked in the trade for a number of
years?—Yes—35 years.

9367. Are you of opinion that it is an unhealthy
trade?—I am sure of it.

9368. What diseases do potters chiefly suffer from?
—It goes by a variety of names; usually we call it, in
the potteries, potters' rot.

9369. That is a form of phthisis—lung disease?—

Yes. The medical profession call it potters' asthma sometimes, and sometimes it is called bronchitis; and recently I saw a doctor's certificate, when a man had died from it, in which he described it as pneumoconiosis.

9370. Do a large proportion of the men and women employed in the work suffer from these diseases?—Yes, a large proportion of the men, but I do not think it is so frequent amongst the women.

9371. Do you think it is connected at all with inhaling dust?—Yes.

9372. What processes in the potteries make men specially liable to this disease?—The hollow-ware presser, the sanitary presser, the flat presser, and I am not sure about the tile-makers. The tile-makers work in an excess of dust, but I am not sure whether flint is used for the tile-makers' dust.

9373. What do you say as to the biscuit-placer?—I never knew any biscuit-placer to suffer from potters' asthma.

9374. Do towers?—Yes.

9375. Do people engaged in any other processes suffer?—I cannot think of any more just now. There are a few cases, where the handlers—that is, the people who put handles on cups and jugs—are located at their work amongst other branches where there is much dust caused. The certificate I referred to just now was in the case of a man who was a handler. Under ordinary conditions the handler is not subject to dust, but having to work with other people where dust prevails he did inhale it, which brought about his death.

9376. Of course, some men work for a long time before contracting this disease, do they not?—Yes. Personally, myself, I think I have been fairly well off. I have been in the trade 35 years, but I have not been compelled to work long hours nor work very heavily, whereas another man, who may have been compelled to earn his living wholly at the trade, would have suffered, perhaps, some years before I should. I was talking to a medical man in our district a few weeks back, and he said that any man who had worked in the trade 22 years was sure to have it; he could not help it.

9377. That is with regard to one of the dangerous processes, is it?—Yes.

9378. The women engaged in painting china, for instance, although pottery workers, would not run any risk of contracting the disease, I suppose?—No. This disease comes, I claim, mainly through the inhalation of dust, because in the dust there are particles of flint. You know, perhaps, in the making of earthenware there is a good deal of flint used. The man who makes the ware has to finish it, which he cannot do until it is dry, and when it is dry bits fall about his feet and his bench. They get trampled underfoot, and are made smaller and powdered, and there is always a constant heat in the rooms which is drying the dust on the floor, and if the sun happened to shine through the window you can see long beams of dust.

9379. (*Professor Allbutt.*) Where does the silicated clay that is used come from?—It is manufactured on the works.

9380. But where is it dug?—(*Mr. Parkes.*) In the Devon and Cornwall mines, and, of course, the flint is the ordinary flint.

9381. (*Chairman.*) What do you think is the least period in which this form of phthisis ever develops? Supposing a man has been working at one of the processes six months, would you be surprised if he got the disease in that time?—(*Mr. Booth.*) I should.

9382. What period should you think would be the least period?—With a weak constitution, I might expect to find it in three or four years in a small degree.

9383. Are you of opinion that compensation should be paid to men who suffer from this disease, under the Workmen's Compensation Act?—I am.

9384. Who do you think ought to pay the compensation; suppose the man has been working for 10 or 20 years, and has gone from one employment to another?—I think the plan ought to be that a general fund should be raised by the manufacturers of the district, and each case ought to be paid from that general fund. I think the trade ought to find the compensation for the disease. Perhaps I might point out a case. The general secretary of our society was the

late Mr. Thomas Picken, who died 12 months ago last December. Had not he been out of the trade for 14 years he would certainly have been dead six or seven years sooner than he was. He had got the disease when he received the appointment as general secretary, and perhaps had had it five or six years before he left the trade, but he could keep on working now and again, as is the case with many potters. They work part time, and are ill two or three days, and may then scramble to work again for two or three days, and it is positively a pain to see how some of the men suffer. I have seen numbers of them whom it has taken three hours in the morning to get to work, after rising from their bed; it takes so long to wash and creep about, and I have seen them standing in the roadways to get breath.

9385. But there is no power under the Workmen's Compensation Act to compel the employers in a trade to combine unless the majority of them are already in some insurance company; therefore it would be a question of imposing a liability on an individual employer. In the case of other diseases the liability is imposed on an employer who last employed the man, unless he can prove that the disease was contracted while the man was working for some other employer during the last 12 months. Have you considered any means by which in a just way the employer can be made to bear the burden of compensating a man who may have contracted the disease over a period of 15 or 20 years?—We have thought about it, and, as a matter of fact, we have talked about it, but the employers themselves did not seem to be willing to take it on, and, seeing that we had so many men who fell by their trade, and often came to poverty and want, and have only been provided for by their own local sick societies or the proceeds of some collection made by their fellow-workers, while the employers largely have not contributed in any sense to any of these suffering people, we, as workers, think it would only be reasonable that the trade that killed the men should pay the compensation.

9386. Would you suggest that the last employer of a man should be liable to pay the compensation, and then let the employers arrange amongst themselves how to spread the burden over the trade?—Yes, I would suggest that, if that is the best that can be got for us.

9387. There is another point, which has rather exercised the minds of the Committee, which I should like your view upon. Suppose potters' asthma or the disease which goes by that name were scheduled under the Workmen's Compensation Act, and the employer was liable to pay, perhaps, half wages to a man for many years until he died, do not you think the employers might get rid of all the men in their works who showed symptoms of the disease before they were incapacitated?—We have looked at that difficulty somewhat, but our society thought that at some time or other, when any reform had to be made somebody had to suffer, and if the older men to-day have to suffer, we shall have to abide by it, but we shall be doing a good thing for the people that are to come after us.

9388. The effect, of course, would be not only as regards the old men of to-day, but the middle-aged men of the future, and as soon as they showed any symptoms of asthma they might be discharged. Do you think it is better for men to be discharged when they first show the symptoms, and thereby be compelled to go into some other employment, perhaps at less wages, which is less dangerous, or do you think it is better for them to work on at the higher wages, and continue in the potters' trade so long as they can work—perhaps for another 10 or 15 years?—Personally I cannot see why they should be discharged. It is the middle-aged men and the old men who have made the trade what it is to-day, and if the trade has made so much money as it has in the past—I do not say the masters, but the trade—then these men, who are now middle-aged, who you say might be discharged, deserve better consideration, and they ought to be protected from being discharged and thrown on to the world.

9389. But how could that be done?—It could be done by making the law prospective for the youngsters of to-day, taking a certain age and not taking it retrospectively at all.

9390. But you cannot pass an Act of Parliament that an employer shall not dismiss a workman, can you?—No.

9391. Then how can you protect workpeople from being discharged if they show symptoms of asthma?

*Mr. J. Booth
and Mr.
N. Parkes.*
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Mr. J. Booth —I mean if a man was discharged by one employer, and that employer said, "You are not a fit workman," and Mr. another employer might engage him; but if he discharged the man and said, "You have asthma," that N. Parkes. would be an excuse for the other employer not to engage him.

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9392. But probably he would not say he had asthma. The matter is in the mind of the Committee and has been considered by them, and I want to be quite sure that you and your society are willing to face the risk that through putting potters' asthma in the schedule to the Compensation Act men who show symptoms of asthma might be dismissed from their work before they become incapacitated and before the employer becomes liable to pay compensation?—I quite see the point, and I have seen it all the way through, and the latter portion of your letter to us last week prevents us from going into the question of what might be in the future. I am free to admit that to-day there is not so much potters' asthma as there was 20 years ago by far.

9393. Do you attribute that to Home Office rules and better ventilation at all?—Yes, and if the Home Office now, or any other Office, would compel better ventilation and better flooring and that kind of thing in the workshops, I think potters' asthma would very soon become a thing of the past except in a few isolated cases. Perhaps I had better say here with regard to the sanitary trade that I am a little bit nervous as to what the future may be for the sanitary workers. Such high-class work is expected from them that when closets and lavatories and so on are being got for the oven and being thoroughly dried—what we call white—the employers demand that a smooth surface, smoother than usually obtained in years past, shall be brought on the fronts of lavatories and closets and everything. They have to be rubbed with flannels and sandpaper and so on until they get a smooth surface. When they have been rubbed with this flannel the men have to blow the dust off.

9394. (Mr. Cunynghame.) Is that after dipping?—No, before it is fired at all—in the clay; before the first firing. There is a man working and blowing the dust off, and another man working close by and blowing his dust off, and by dinner time the place is full of dust.

9395. What is that dust composed of? Is it composed of the body of the ware, and would it have flint in it?—Yes.

9396. (Chairman.) You have not quite answered my question. If you would prefer not to answer it say so, but we should be very glad to know whether on the whole you are prepared to face the risk of men being discharged through this liability to compensation falling on the employer?—My society has authorised us to say that we are prepared to take the risk.

9397. (Mr. Cunynghame.) At present, as things are, out of say 20 men, how many get potters' rot towards the end of their lives? What figure would you give as an estimate?—Out of any 20 men you choose, do you mean?

9398. Yes. If you went through the trade and took, say, 100 men, how many of them under present conditions would you expect to find afflicted in the way you have described?—After 30 years' work in the trade I should expect to find 80 out of the 100 affected.

9399. Do you mean 80 should be compensated under the Workmen's Compensation Act?—Under present conditions I should expect to find 80 affected by the disease.

9400. Who would have to be compensated under the Workmen's Compensation Act?—No.

9401. How many would you expect would have to be compensated under the Act, administered in a fair and reasonable way?—I do not think I could answer that, because there are so many different kinds of workshops. You might go into one workshop full of hollow ware pressers. I worked in one where there were 70, and it would be as airy and healthy perhaps on some days as this room itself, but when all the people are dealing with the white work you get the dust. If you go into some workshops you see windows out, boards stuck up, damp floors, the ware drying, a bad atmosphere in the room, and a low ceiling, and under these conditions there would be a greater percentage of sufferers from potters' asthma than there would be in the shop I referred to first.

9402. You could not give me the proportion out of the 80 odd who would in your view come under the

provisions for compensation, could you?—No, I could not, not to be safe.

9403. (Dr. Legge.) I suppose you agree that many occupations in the pot banks do not expose the workers to contracting the disease?—Yes, a great many; the majority are not subject to it, I think.

9404. Did you include in the list you mentioned tile dust?—I did mention it, but I am not quite sure that they use flint in this particular dust. There is one employer whom I questioned on the matter, and he said there was no flint used in it, but whether that is so or not I could not tell you.

9405. You are referring to the tiles which are made out of the compressed dust, are you?—Yes, that is what I referred to as well. I am not quite sure whether there is flint used in the tile dust or not. Some of the workpeople tell me there is; some of the employers tell me there is not.

9406. Have you any persons employed in that particular process who are on your sick funds that you know of?—We have not any sick fund in connection with our society.

9407. (Chairman.) Are there any other diseases apart from potters' rot from which potters suffer which you think might be included in the Workmen's Compensation Act?—The potters' system, through working in the hot rooms, is subject and more susceptible, I think, to diseases of other kinds. Take myself, if you like, a man just touched with the disease, as perhaps you can perceive I am. I am working in a hot room, and perhaps on an evening, like it may be to-night, I go out of the room with perspiration pouring from me and a chill strikes me. Had not it been for the potters' complaint very likely the chill would not have happened, but through the weak condition of the system I am more susceptible to cold, I think.

9408. Is it not very difficult in any case of that kind to say whether or not the disease arises from the man's employment. Take a man and his wife living in the same house both having cold or both having a touch of bronchitis, the wife does not go to the pottery at all, but the man does. It is very difficult to say, is it not, that the man's complaint is due to his employment and the woman's is due to some other cause. Would you suggest for all the ill's flesh is heir to the employer should pay compensation?—No.

9409. Then it is mainly the question of potters' phthisis which you wish to bring before this Committee, is it?—Yes.

9410. (Chairman.) You have heard the evidence given by Mr. Booth, have you not?—(Mr. Parkes.) Yes.

9411. Do you agree with the general purport of it?—I do. I should say with regard to the last question put to Mr. Booth, I think you were referring to potters' eczema.

9412. Have you anything you wish to bring before the Committee in addition to what he has said?—We have no instruction with regard to it at all, but with regard to the girls who work in the lithograph shops their hands are very bad sometimes, and I have seen them myself all broken out; it has been put down to the trade, but whether it is so I do not know.

9413. Does that happen very often?—Yes.

9414. What do they attribute it to?—I think they attribute it to the work, and always using a damp sponge and colours.

9415. It is a kind of eczema, is it?—Yes.

9416. Are they prevented from working by it?—Yes.

9417. Do they have to stay at home?—Yes.

9418. Are they ever kept home for more than a week?—I know of one girl who was kept away longer than a week. I should think longer than a fortnight.

9419. Have you worked for many years in the potteries?—Yes.

9420. Have you come across many cases of potters' asthma?—I have.

9421. Have you come across any recent cases of death?—I have. I had some particulars furnished to me at our Lodge at Tunstall on Saturday night. I was informed by a man who worked at a certain firm that three men out of one workshop had died within the last three months from this complaint. One of the men was named A., aged 34; he suffered six years, and had been totally incapacitated for 12 months, and died in the

middle of December, 1906. Then B., 54 years of age, had been suffering for five years, and had not worked two months in the last 12 months. Then C., 53 years of age, had suffered for three years, and died on Friday last. These three men had all worked in one shop, and the people I saw on Saturday night made great complaint about the condition of the workroom. They said the roof was bad, the plaster was continually falling and breaking their work; in the morning when they went to work their aprons were damp and had to be dried before they could put them on, and they could not see through the windows for the steam on them in the afternoon. You will understand these factories are heated by steam, and although that may be an advantage in some way, it is certainly not for the good of the workers, because in the old potters' drying room the fire stove used to provide some ventilation, but now you get the doors and windows closed, and with the heat from the steam pipes and the drying clay you get a moisture and a heat which is detrimental to health.

9422. Has your Lodge made any complaint to the local factory inspector about this?—I only got the information on Saturday night.

9423. You will make a complaint, I suppose?—Yes. (Mr. Booth.) We have made many complaints to the factory inspector.

9424. Have you had some other cases of death quite recently within your own knowledge in your neighbourhood?—(Mr. Parkes.) Yes. There are the cases of D., E., and F. I knew D. and E. well, but F. I did not. I know he has just died recently in Middleport. Then there is a man named G., who is among those now suffering, and others, all within a short distance of where I live.

9425. Are you sure all these were cases of potters' asthma and not of ordinary consumption?—To the best of my belief, they were all cases of potters' asthma, and, from what I can see, out of the whole of these cases they were cases of dust.

9426. Have you any statistics which you wish to lay before the Committee as to length of incapacitation?—No, I could not get any, and I do not think there are any in existence with regard to the length of incapacitation.

9427. Or the number of deaths?—Yes.

9428. Are the figures in your proof simply drawn from the tables of the Medical Officer of Health?—Yes.

9429. Have you any figures which you wish to place before the Committee?—Dr. Mott, the Medical Officer for Burslem, in his annual report for 1904, gives out of a total number of deaths of 864, 52 cases of phthisis, 35 other cases of tubercular disease, 92 of bronchitis, respiratory cases 43, heart disease 57, or a total of 279. Out of the same number of deaths in 1905 from phthisis there were 50; 31 from other tubercular diseases, 100 from bronchitis, 47 from other respiratory diseases, and 56 from heart disease.

9430. Do you draw from that the conclusion that the number of cases of deaths from diseases of the respiratory system generally is very large in the town of Burslem?—I do.

9431. Do you agree with what was said by Mr. Booth as to the willingness of the pottery workers to run the risk of dismissals taking place if this disease were included in the Workmen's Compensation Act?—They know what appertains in regard to the workers, and in the meetings where this matter has been dealt with there has been no hand held up against it. It has not been discussed as to whether they are willing to take the risk, but our instructions are to press it for all we are worth.

9432. Taking the whole situation into consideration, your Union is anxious to have potters' asthma included in the schedule to the Workmen's Compensation Act, is it?—Yes.

9433. (Mr. Cunynghame.) That is, I suppose, potters' asthma from dust?—Yes.

9434. There might be asthma, of course, from colds and other things, but it is dust asthma that you are really dealing with, is it not?—(Mr. Booth.) Yes. (Mr. Parkes.) May I place on record the accounts of Dr. Partington, of Tunstall? In his annual report for 1901, and also in his report for 1903, these identical words occur: "A large proportion of the cases have been fibroid phthisis, and have nearly all occurred amongst persons employed in branches of pottery manufacture, thus suggesting defects in the sanitary condition of the workrooms."

9435. (Dr. Legge.) Are you aware that there will be a number of cases of ordinary phthisis occurring among these workers?—Quite so.

9436. And that ordinary phthisis is infectious, and can be conveyed from one person to another?—Yes.

9437. You spoke of three cases that had occurred in one workshop, where the conditions were bad, and I noticed that two were aged 53 and 54, and another was aged 34 years. Are there many potters at the age of 34 who are suffering from chronic fibroid phthisis due to dust, or potters' asthma?—I could not say that I could give you the name of anyone about that age. (Mr. Booth.) I should not think there are many. Yet one has seen cases from time to time where they have died at 30 years of age, and possibly slightly younger. I call to mind now a man named _____, who worked with me at Messrs. Meakins', at Tunstall, who died from potters' disease, and he was under 30.

9438. But if there are two men suffering from potters' asthma with phthisis added to it, who are working in the same shop, it is quite possible, is it not, that one might have infected the other with ordinary consumption?—I should think so.

9439. You have recognised all those conditions, have you?—Yes. (Mr. Parkes.) But I should say a man would more readily contract it than if he was in a good state of health.

9440. But the age is much younger than is common with ordinary cases. Would you regard it as an impossible condition to fix a limit of age at which a person should come under the schedule—say fibroid phthisis occurring in a person over 40 years of age?—That is a matter we have not gone into, though Mr. Booth and myself have talked it over.

9441. That would limit any dismissals to persons over that age?—(Mr. Booth.) Yes.

9442. Or that there should be no claim under, say, 20 years, of working as a potter. I understand you have not considered those aspects of the question?—(Mr. Parkes.) No, we have not. One doctor tells us we must not place too much reliance on the names of diseases in this connection. Another doctor, and a very responsible man, too, said there are certainly a large number of cases of bronchitis due to potters' disease. With regard to the flint, a doctor who knows the district and the trade, said that in a place where a large amount of flint is being used you get the fibroid phthisis cases, but when you have to deal with the ordinary clay you will probably get chronic bronchitis. We do not get a certificate scarcely at Burslem specifying fibroid phthisis. Many of the cases are classed with the bronchitis cases or other respiratory diseases.

Mr. J. Booth
and Mr.
N. Parkes.
18 Mar. 1907.

THIRTY-SECOND DAY.

Tuesday, 19th March 1907.

PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Mr. T. M. LEGGE, M.D.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. R. SMILLIE, called and examined.

Mr. R. Smillie,
19 Mar. 1907.

9443. (*Chairman*.) Are you the president of the Lanarkshire Miners' County Union and of the Scottish Miners' Federation, and a member of the Executive Committee of the Miners' Federation of Great Britain?—Yes.

9444. Do you attend on behalf of those bodies to give evidence before this Committee?—That is so.

9445. With regard first to miners' nystagmus, are you of opinion that that is a trade disease for which compensation ought to be paid?—I am. I think, if not entirely confined to miners, that they are particularly affected by it, and I think it arises largely through working underground in unnatural positions, lying on their sides, and so on, and that the artificial light is very insufficient.

9446. Have you many cases of it in Lanarkshire?—We have quite a number of cases in the central districts of Lanarkshire—in what are called the fiery districts.

9447. Do the men recover if they are away from their work for a long time?—In some cases I have known them come to the surface and work for a time, and they have recovered and started underground again.

9448. And have had no relapse?—And had no relapse. They usually start again in pits where the naked light is used.

9449. Is it easy, do you think, to tell when a man is really incapacitated by nystagmus, because a man might have it in a mild form and go on working for years, might he not?—I do not think a layman could tell very easily, but I think a doctor working in a mining district could tell easily whether a man is incapacitated or not.

9450. (*Professor Allbutt*.) Supposing you have two men, one with slight nystagmus and the other with very marked nystagmus, might not the man with slight nystagmus have genuinely a good deal of suffering, so much indeed as to amount to incapacity; whereas the man with a large amount of nystagmus might not feel ill at all?—I do not know sufficient about the subject to give an opinion upon that.

9451. This variability would be a difficult element to deal with in regard to malingering, would it not?—Yes; I think to a very great extent the doctor might require to be led by the patient's statement.

9452. Now there is no great temptation to malingering, but if the temptation were considerable a doctor might be placed, might he not, in a much more difficult position?—He might.

9453. Would you leave the matter entirely to the physician to judge?—I would. I am strongly of opinion that there are only a very small percentage of our people who would be likely to malingering.

9454. Do you mean that they are better than human nature generally?—No; I mean that human nature is sufficiently good generally. I have formed that opinion after close connection with our people. I have known men receiving compensation and at the same time receiving money from a friendly society which amounted to their wages who have come to us and asked to be allowed to resume work again, even when the doctors said they thought they should not.

9455. (*Mr. Cunynghame*.) There is this to be said, is there not, that a man does not like living long even on half wages? What would half wages come to roughly with you, taking an average man?—Fourteen shillings a week.

9456. Supposing him to be a man desirous of malingering, even then he would pause, I suppose, before wishing to live on 14s. a week rather than 28s. ?—I think so.

9457. We may count on that, I suppose, as a factor?—I think he would be terribly foolish to attempt to live on 14s. a week if he could earn twice that amount.

9458. We know there are men who will live in a union workhouse when they ought to be working in the mines?—I think there are very few cases of that kind.

9459. (*Dr. Legge*.) Is there a consensus of opinion amongst the men that once a man has suffered from the symptoms of nystagmus he should not go back to work under ground?—No.

9460. You have mentioned cases in which men, to your knowledge, have gone back?—Yes.

9461. But do not you know that it is the practice of all the medical men to forbid a man, who has consulted them for symptoms due to nystagmus, working under ground?—I have been told by our own eye specialist that they on all occasions advise the men not to go under ground again; but I know that the men do so, because if they recover sufficiently to begin the work under ground again they can earn more money than by working on the surface.

9462. Then they are not disabled in cases like that because they cannot do the work, but simply because the doctor says they must not work under ground?—Yes.

9463. (*Professor Allbutt*.) In your district a man has a good chance, I suppose, of being able to get into a better-lighted pit?—Yes, they can change from closed-light pits to open-light pits.

9464. (*Chairman*.) Nystagmus takes years to develop, does it not?—I think it does.

9465. Have you considered at all who ought to pay the compensation if a man is suffering and incapacitated?—I have thought the matter over, and the conclusion in my mind is that it is very difficult to fix who should pay the compensation, but naturally if compensation was paid it would have to be paid by the employer in whose employment the person was at the time the nystagmus developed to the point at which the man could not work any longer.

9466. That would throw a rather heavy charge on that particular employer. Do not you think there is some danger that the employers might have the colliers' eyes examined to see whether they were suffering from nystagmus, and if they were, to discharge them before they were incapacitated?—I think there is a probability that that might be done.

9467. Do you think that in the interests of the men it would be better for them to have compensation with that risk than not to have compensation?—I think it would be better that they should get compensation and take that risk. I do not think it would

be correct to say that any particular employer would run more risks than other employers, because the men shift from colliery to colliery, and each employer would be taking the same risk. Therefore no one employer would have more than the number he was entitled to of persons who were affected with nystagmus.

9468. Unless some employers adopted the system of medical examination and rejected such men and they sought employment with others?—Then if others accepted them without medical examination it would fall more heavily upon those employers.

9469. But your own view is, is it, that it is better to take the risk of such discharges than not to have the compensation?—I think it is.

9470. With regard to beat hand, beat knee, and beat elbow, do you have many cases?—I have known a good many cases in my experience. The Scottish term for it is "bursed hand."

9471. Is beat elbow frequent?—It is not very frequent with us. I have known cases of men being off work with it.

9472. Are they off work from any of these three injuries for more than a week occasionally?—Yes, I have known men off with beat hand eight or ten weeks, when they have had to get it opened by a doctor.

9473. With regard to miner's asthma, are you of opinion that the inhalation of coal dust causes any disease of the lungs?—I think it tends to injure the lungs and make the miner more susceptible to asthma.

9474. But the asthma itself is the ordinary form of asthma from which other persons suffer, I suppose?—Yes; but it is more prevalent amongst miners, because of the impurities of the atmosphere which they have to breathe.

9475. Do you think it would be possible in any given case to say whether the asthma was due to the man's employment or whether it was not?—It is quite clear on many occasions. Men work for a time in an impure atmosphere where they themselves are quite aware of the fact that if they continue working under those conditions for a number of months they will have an attack of asthma which may develop into chronic asthma.

9476. Is the impurity of the atmosphere of which you speak due to dust or due to foul air?—Chiefly to foul air.

9477. Do you think there is any miners' disease which is distinctly due to dust, as grinders' disease is distinctly due to steel dust or stone dust?—I do not think so.

9478. You do not think there is any miners' phthisis like potters' phthisis?—No; I think coal dust is so light that it has not any effect upon the lungs.

9479. You do not find any large proportion of miners suffering from phthisis, do you?—No, not a large proportion.

9480. But you think, do you, that asthma is a disease to which they are specially liable owing to the foul air which they inhale?—I do; and I think it is also encouraged by the fact that they are very hot when working underground, and sweating when they come to the surface, and the sudden cooling must encourage the disease.

9481. (Professor Allbutt.) On an average we will assume that miners are more apt to get a sort of senile bronchitis than other people, but it is a very difficult thing, is it not, to apply it to any particular case and say, "Here is A. B. Is A. B.'s asthma due to his employment, or is it merely an instance of a very prevalent affection amongst the public in general?—I have no doubt in my own mind that a very large proportion of cases of asthma could be traced directly to the employment and to the conditions under which the men are working.

9482. Will you tell me how?—I have known some parts of a colliery in which it was well known to all the men that the ventilation was insufficient, and that there were accumulations of black damp, and I have known a large proportion of the men who worked steadily in that section being laid up with asthma.

9483. A larger proportion than were engaged in other parts of the same mine?—Yes. I have known mines which were notoriously badly ventilated where a number of the men have succumbed to asthma.

9484. Are there any other means of discrimination, do you think?—I do not know of any.

9485. (Mr. Cunynghame.) Of course there are a great many other trades and industries in the country, are there not, where people suffer from bad air? For instance, take milliners shut up in rooms, and post office clerks in small telegraph stations, and places like that?—Yes, but the bad air they suffer from has not the same effect.

9486. It is CO₂, is it not?—Yes, but not to anything like the same extent that we meet with it in mines. Very often in mines you find men working—I myself have been working—in a place where you could scarcely keep a light alight because of the presence of CO₂.

9487. We know a lamp will go out easily where a man could work comfortably, I suppose?—I would not care to go on working very long where a lamp would not burn.

9488. Has not that condition of things been enormously altered?—The conditions have been improved enormously, especially in the larger mines, but in the smaller mines, and in the mines which are now becoming exhausted, the presence of CO₂ is continually with them, coming from the old disused workings.

9489. Is not that a question rather for a stricter enforcement of mining rules than for putting it down as a disease applicable to all mines? Is not it a question rather for improving the conditions than to put it down as a disease incident to the whole trade?—I think not where blasting is going on with high explosives.

9490. But that is another gas, is it not?—I think there is far less miner's asthma arising from the gas with which we are now dealing—from CO₂—and deficient ventilation than there was thirty years ago. I have been brought up all my days practically in a mining district, and during the past thirty-five years, and even now, I can point to a considerable number of people who are physically strong, and who are willing and anxious to work, but who are laid aside, and have been for years and years, with asthma, perhaps, at forty years of age. My own brother-in-law has not worked for nine years, although he is strong enough physically, but he cannot work because of asthma arising out of his employment as a miner.

9491. On the other hand, there is a certain amount of asthma which is common to all the population, is there not?—I quite admit that; but what I am dealing with is cases of asthma which clearly arise out of the employment of the person, and to me it seems that if a person has any disease which incapacitates him from his employment, and clearly arises from his employment, it should be treated as an accident.

9492. (Chairman.) Do you think it would be possible to prove these cases in a court of law?—Many of them. Our local doctors would be prepared at any time to go into court and clearly prove certain cases where they knew the men had for a time been working in a vitiated atmosphere.

9493. (Professor Allbutt.) There are other contributory causes, are there not, such as great changes of temperature? In certain mines where there is an accumulation of CO₂ I suppose the air is stagnant and warm?—No; where there are bodies of CO₂ the air is usually colder.

9494. Putting it generally, I suppose there is a very great deal of exposure to extreme changes of temperature in coming out of the pit whilst sweating, and so on?—That is so.

9495. The temperature being much higher down the pit, and, I suppose, the deeper the pit, the hotter it is?—Yes.

9496. Would you say the depth of a pit had anything to do with the development of bronchitis or asthma?—Really, I could not say.

9497. Would not dressing-rooms on the bank where the men could turn in and have a rub down and change their clothes be beneficial?—Yes, it would be a very good thing for them.

9498. As a medical man, I would suggest that the disease may be due to changes of temperature rather than to CO₂, and do you not think a provision of that kind would very greatly reduce the liability to the disease?—I think it would very largely reduce liability to rheumatism and asthma.

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Smillie.

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9499. (Mr. Cunynghame.) If a man is working in a very hot place, and he is going to come up afterwards into the cold air, prudence dictates that he should put on some warm clothing; but supposing he does not and gets some complaint through it, you could hardly call that a trade disease; could you? Take, for instance, a cabman who persistently never wore a great coat at all and get rheumatism, could you say the rheumatism was necessarily a cab trade disease?—If he never wore a great coat while other people did for protection you could hardly say it was due to cab driving; but the position here is that a miner comes out of a hot pit, his shirt and drawers and trousers are wet with sweat, and he may have to walk two miles home on a frosty day and by the time he gets home he is shivering with cold.

9500. If he had a good great coat to put on at the surface it would preserve him, I suppose?—Undoubtedly it would.

9501. As a fact, they do not have that protection, do they?—In some districts where they have to walk a considerable distance to their work they very often carry with them waterproofs or overcoats, and leave them on the surface and get them when they come up again to protect them either from the cold weather or the wet weather.

9502. With regard to the question of baths, are you aware that in Germany they have baths for the miners?—Yes.

9503. I have heard it said that it is better for the men to bathe at home, and that they are less likely to get chills after their bath, and that that custom is preferred by our people. Do you think our miners, if baths were provided on the surface, would prefer them to having baths at home, not considering the question of expense? Which do you think is best, for a man to bathe when he comes up from the mine or bathe when he gets home?—It would be a thousand times better if he bathed when he came up from the mine and shifted his clothes—if he had two sets of clothes, one for mining and another when he came up. As a matter of fact, not five per cent. of the Scottish miners have a bath at home. They wash merely in a tub or a basin of some sort; they merely wash their face and neck and breast and arms.

9504. Are you aware that in many parts of England miners do take baths?—It is not at all common in Scotland. I know that not five per cent of the Scottish miners have baths unless they go to the public baths, and I know that very often they go home and do not change their clothing for perhaps an hour or two hours. If there were baths at the pits' mouths it might take a few years to get them to use them, but I am sure they would ultimately use them, and it would be beneficial to their health.

9505. On the whole the health of miners is decidedly good, is it not?—I do not agree altogether with the statistics that are given. The death rate would lead to that conclusion, but I do not think if the percentage of sickness was taken into consideration and the number of men laid up from time to time with rheumatism and bronchitis, the health of the miner will come out better than that of men employed in other trades.

9506. If you call rheumatism a trade disease we should have it in a great many trades, should we not?—In many mines miners work in water, and stand in ice-cold water sometimes up to the knees for the whole of their day's work of eight or nine hours. In other cases water is raining down from the roof on them, and they are not ten minutes at work before they are wet through with ice-cold water.

9507. Those cases are exceptional, are they not?—Yes, but in many collieries which are newly opened out it is a common thing to find men coming out of the pits, perhaps ten or twenty of them, who are drenched from the head to the heels.

9508. Still to put rheumatism down as a trade disease for miners seems a strong order, does it not?—If it could be proved that it arose out of their employment I think they are entitled to compensation. I do not want to say it is by any means confined to miners, but what we say is that if the committee are satisfied that rheumatism does arise from employment in mines, and the men are incapacitated from rheumatism contracted during their employment, mining or any other employment, then it should be scheduled.

9509. You do not think the disease scheduled ought to be in some respects peculiar to the employment?—No, I do not think so, because I think it is more prevalent amongst farm servants than amongst miners.

9510. With regard to diseases resulting from fumes from high explosives, they would be peculiar, would they not?—Yes.

9511. Could you give any information with regard to that? Certain explosives are more dangerous than others, are they not?—All the high explosives are more dangerous than the powder—the low explosive—but I could hardly particularise which of the high explosives are the worst. I believe that dynamite nitro-glycerine in its earliest form was one of the worst.

9512. That only occurs where the ventilation is rather bad, does it not, and if the ventilation is good, hardly enough fumes remain to do harm?—It all depends on the amount of shooting. I was down a pit a few days ago where they were shooting from one end of the place to the other nearly all day, so that the air could not be kept clear of the fumes, and men were complaining of sore heads, and ultimately in some cases they had to be taken home and lie up for a short time.

9513. What do you mean by a sore head?—A pain in the head—a headache.

9514. It does not incapacitate men for a very long time, does it?—No, it does not, but the effects arise afterwards and develop into miners' asthma.

9515. Are you sure of that?—I am absolutely convinced of it from my own experience. I have known men before reaching the age of forty-five, who are otherwise physically strong, and who did not seem to be predisposed to asthma in their youth, who had been using high explosives, who have taken asthma.

9516. (Chairman.) Are the men incapacitated for more than a week by it?—I have known them hardly able to walk out at times, but within a week they have been able to resume their work.

9517. How many years would a man be able to work with rheumatism before he was quite incapacitated?—Ten or fifteen years. I have known miners suffering from rheumatism which I feel has arisen out of working in wet places. I have known them work on for fifteen years, and then ultimately they have had to lay up and could not go to work again.

9518. Who do you think ought to pay them compensation?—It is very difficult to say.

9519. Ought it to be the last employer, who takes, perhaps, great care of his men, and who sees that his place is properly drained, and that there are no bad conditions, or ought it to be the employer who had taken little care of his men, and who allowed bad conditions to prevail, where a man had first contracted the rheumatism twelve or fifteen years before he was incapacitated?—Clearly it should be the employer in whose employment the disease was contracted, if he could be fixed.

9520. Do you think it practicable to take into a county court an employer for whom a man has been working fifteen years before, and give evidence as to the condition of the pit at that time?—I do not think it would be practicable.

9521. Have you any suggestion to make as to how any such disease as rheumatism could be brought within the purview of an Act like the Workmen's Compensation Act?—I think there would be very great difficulties, and it must lead to a considerable amount of litigation. The scheduling of any disease would lead, I think, to a very considerable amount of litigation, but the scheduling of rheumatism, and we want it scheduled if the Committee can do it, would certainly give rise to great difficulties in fixing who should pay the compensation; it is not like where an accident takes place, because that is clear and distinct.

9522. Or even in a case like beat hand or beat knee?—Yes, where the disease has arisen within a very short time; but with regard to rheumatism and asthma, unless it could be proved that they arose from the immediate employment at the time, I think there would be great difficulty, and I quite admit it might be a very great hardship on an employer who had taken all the care he could be expected to take to force him to pay compensation when it might be that the injury to the person had arisen before he entered his employment. May I say that at the present time if a miner has lost an eye in the employment of A, and

afterwards got employment with B, and may by accident lose the sight of his other eye, B has to pay him compensation for the loss of his sight; no one takes into consideration that he has lost one eye. There may be the danger that B does not employ him because he has only one eye, but if he does, and he loses his other eye, B is responsible for the loss of his sight. The same thing applies with regard to a person only having one hand; if he enters employment and loses his other hand the employer is held responsible.

9523. (*Mr. Cunynghame.*) Is the prevalence of rheumatism and bronchitis well known amongst our colliers?—Yes.

9524. (*Chairman.*) Do you think it tends to raise their wages?—I do not think so.

9525. Have you anything you wish to state to the Committee with regard to sprained wrist?—There is sometimes a difficulty in knowing the exact time at which sprained wrist may arise. There may be a slight sprain at first, and the miner works for weeks and weeks suffering from it, but it ultimately gets so acute that he has to stop work altogether. In other cases a sudden jerk when working with a heavy hammer or pick may sprain his wrist. He may work away for a time, anxious to continue earning money, but ultimately he will have to give up. Sprained wrists are very prevalent amongst miners. They wear a little strap on the wrist, and work away for months and months until they are ultimately forced to give up altogether.

9526. Have you taken any such cases into court with a view to getting compensation?—We have had two cases in court within the past six months, but I have no record of them, although I can send them on. We took two cases of sprained wrist into court, and failed in both cases.

9527. On the ground that it was not an accident?—Yes.

9528. (*Professor Allbutt.*) It was a gradual overworking of the wrist; I suppose it was cumulative?—Yes.

9529. (*Chairman.*) Would the men recover and be able to resume work again?—I am not sure about those two cases I have spoken of. In some cases the wrist becomes perfectly strong again, but in other cases it never becomes sufficiently strong to enable a man to follow his employment as a miner. Eighteen years ago I sprained my left wrist while working under ground. I worked away for several weeks, and did not pay much attention to it other than rolling a string round it to keep it tight. I knocked off work for fourteen weeks and went to the infirmary, but I was too late, and they could not put it right, and I ultimately had to give up working in the pit, and even now I could not follow the employment of a miner.

9530. Was that a matter of slow growth?—No, it was done just at once; it was a slip of the hammer, but it was not sufficiently serious at the time, I thought, to justify me in stopping work. I worked away, and it would not have been counted an accident.

9531. Do cases ever occur in which men go into the mines who are really not physically suited to be miners because of weak wrists, and after a time their wrists break down through the strain of the work?—I doubt if there are cases of the kind; there may be cases where the wrist is weak, and, of course, the miner's work means a great strain on the wrist and arms.

9532. Do you think that it would be a right thing to require an employer to pay compensation,

perhaps for the whole of a man's life, who was incapacitated through having a weak wrist?—I do not think it would be necessary that he should. The probability is that a person's wrist would recover sufficiently to enable him to follow some employment, if not mining, but if the injury to the wrist arose out of his employment, then I think the employer in whose employ he was at the time of his injury should compensate him, and if necessary compensate him for life if he is unable to work because of that injury, just as if he had lost his sight or his hand.

9533. Do you think it would be possible to prove that weakness of the wrist was due to the employment and was not constitutional? Do you think cases occur in which that could be proved?—Undoubtedly.

9534. Supposing a man had been working for several years and had not suffered from his wrist, and afterwards did suffer, do you think that would be sufficient proof that the weakness to the wrist was due to the employment?—I think so.

9535. (*Dr. Legge.*) Would you be content to limit your claim to cases where there were active signs of inflammation of the wrist?—No.

9536. If a person has a sprained wrist he will have a swelling there which can be seen, I suppose?—Not necessarily.

9537. He would in the case of a distinct sprain—not, perhaps, in the case of a strain. Do you include strain under the word sprain?—The wrist I have been referring to—I do not know whether I am correct in calling it sprained wrist—does not show any outward sign at all. In some cases some of the sinews get up, and there is a swelling.

9538. Then there would be something definite to go upon?—Yes, that is easily distinguished, and the doctors can at once discover it. In my own case there is one of the little bones out of place, but you could not see it on the surface. I worked for several weeks with it out, and they put it in, but it did not stay in, though it did not show any signs.

9539. (*Mr. Cunynghame.*) That would be an accident. I should think, would it not?—It would not be held so in court.

9540. (*Chairman.*) Why not?—If a person suddenly twists his wrist, and a little bone comes out, and he works away for weeks afterwards, though in pain, he would be told when he went to court, in the first place, that the employer had had no notice when the accident took place, in the next place he would not be able to prove exactly when it took place, and it would be held by the court that it was not an accident.

9541. (*Professor Allbutt.*) Have you any medical evidence which you could produce from any doctor who is familiar with these sprained wrists?—The doctor in our own district is very familiar with them.

9542. (*Chairman.*) Could there not be similar injuries to other parts of the body?—Yes, there could.

9543. Do they occur?—The men who convey the coal from the coal face to the bottom often strain their ankles severely by a sudden twist, but that, I think, would be held to be an accident. I do not know that there is any sprain of other parts of the body which comes on gradually, as a sprained wrist sometimes does.

9544. If you wish to submit any further evidence, medical or otherwise, with regard to strained wrist, will you communicate with the Secretary to the Committee?—Yes.

Mr. W. E. HARVEY, M.P., called and examined.

9545. (*Chairman.*) Are you the secretary of the Derbyshire Miners' Union?—Yes.

9546. Are you also connected with the Miners' Federation?—Yes.

9547. What is your position?—I am on the executive committee.

9548. Are you speaking on behalf of those bodies here to-day?—Yes; I am appointed by them.

9549. What miners' diseases, do you think, ought to be included in the Schedule to the Workmen's Compensation Act?—They are various. The one we suffer most from in our county and in the Midlands is nystagmus.

9550. Will you give a list of the diseases to which

you wish to draw the attention of the Committee?—There is what is called the housemaid's knee, caused by kneeling on the coal in the thin seams. It hardens the knee, and sometimes the dust gets into the flesh, and we have terrible cases of the kind.

9551. (*Professor Allbutt.*) In every case the knee is hardened, is it not?—Yes.

9552. (*Chairman.*) Can you give me the list of diseases?—Then there is asthma, as the result of the inhalation of coal dust, and there is what some people call anæmia, caused by working in water and handling a pick. That is the result of working in what is called "ochrey" water in our county.

9553. Is beat hand another disease?—That would be the right designation. Then bronchial complaints

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Mr. W. E. are very prevalent, as the result of working in high temperature.

Harvey, M P. 9554. Then it is nystagmus, beat hand, beat knee, and asthma and bronchitis about which you wish to speak, is it?—Yes.

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9555. With regard to nystagmus, do you have cases of men returning to work cured after having had it?—We do if we put them to work on the surface. Perhaps we have tested this more than anybody else, and I do not know of any county which has tested it as much as we have. We have had 524 men examined who were working with lamps, and 573 men who were working with candles. No doubt you have heard of Dr. Court, the specialist, whom we asked to take this matter up. I went round with him and examined the men who worked with lamps and the men who worked with candles, and out of the number who worked with lamps we found 160 bad cases of nystagmus. We examined 381 stallmen, 31 holers, 62 loaders, 7 headers, 3 putters, 29 pony drivers, and 11 daymen.

9556. Were they taken haphazard?—Yes; we invited the branches to call a meeting of the men, and that Dr. Court and I attended, and the men who came were all examined, no selection being made.

9557. Was it known that the meeting was for the purpose of examining the men's eyes?—Yes.

9558. Then the men who had nothing the matter with their eyes probably did not attend?—Yes they did attend; as the report shows, 524 attended, and out of the 524 working with lamps 145 stallmen had nystagmus and 54 had photophobia, which is another name for dread of light. There were also 117 who had night blindness.

9559. I suppose that every person in the village who had anything the matter with his eyes would come to that meeting, while a considerable number who had nothing the matter with their eyes did not come to the meeting. You did not examine all the men employed in the collieries, did you?—No.

9560. You would not suggest, would you, there was the same proportion throughout the whole of the Derbyshire and Nottinghamshire collieries?—I would.

9561. Would you say that one-third or one-fourth of the whole of the colliers suffered from nystagmus?—Yes, in degree, of course. It is very common for you to see men when they go into a room glaring—they cannot bear the light at all.

9562. How many of these men would be incapacitated from working?—Not many of them; their suffering is at home. I have known of miners who have to be led by their wives when they go out on a dark night.

9563. (Mr. Cunynghame.) But still they work, do they?—Yes, they work; they seem to be better in the pit than they are out of it.

9564. (Professor Allbutt.) They have got used to the gloom, I suppose?—Yes. Then we examined 573 men who used naked lights. They have what they call in the county vernacular a flaming lamp with a big wick, which gives a three-candle power light. We examined those men who used that light, and these were the details:—Stallmen using torchlamps, 200; stallmen using candles, 256; holers using torch lamps, 21; holers using candles, 23; loaders using torch lamps, 7; loaders using candles, 46; deputies using lamps (safety) in candle pits, 10; daymen, 7; corporals in candle pits, 2; underground manager in candle pit, 1; total, 573. As to these, we found 5 stallmen only out of the 200 using torch lamps suffered from nystagmus; only 1 holer amongst the 21 had nystagmus, but all these men had the disease very slightly, and none of them suffered from photophobia or night blindness.

9565. (Mr. Cunynghame.) Out of the 573 how many were suffering?—Five stallmen out of 200 using torch lamps suffered from nystagmus.

9566. And how many of the others?—One holer amongst the 21 also had nystagmus. They acquired the complaint in safety lamp collieries, and had nearly got well while using naked lamps.

9567. (Chairman.) Then is it your conclusion that men suffer hardly at all where they use naked lamps and a great deal where they use safety lamps?—That is so. On purpose to test this more fully we went to the Forest of Dean, outside our district altogether, and examined some 500 men, and did not find a case

of nystagmus, because they worked with candles—naked lights.

9568. Is it proved, then, in your opinion, that nystagmus is due to the safety lamps?—Very largely; there may be other causes, but I do not know of them.

9569. (Professor Allbutt.) Do not you think it would be possible to devise a safety lamp which would minimise the risk of nystagmus?—I think what is needed is an increased light. The difference between a naked light and a lamp is that you can put a naked light anywhere, you can suit the position to the eye, but the lamp you cannot, because you must hang it somewhere, and there are shadows all round it; it must be placed far away from the swing of the pick, because you might injure the gauze.

9570. (Mr. Cunynghame.) Have you seen electric lamps in use at all? Do you think they would be of any use with regard to nystagmus?—I have not seen them used in mines; I do not know that they are in use. I might say that I have worked twenty-five years in a pit myself, actually hewing coal, and I have had nystagmus, but I never had it until I worked with a lamp. I have had to be led by my wife to chapel. I could not go without my wife's assistance.

9571. (Chairman.) Have you quite recovered now?—Yes, quite recovered. I have no hesitation in saying that it was the lamps which caused it. Of course, there are medical men who have not gone into the question who set up the theory that it was caused by the cutting of coal, but whether a man works with a lamp or a candle he works under the same conditions.

9572. (Professor Allbutt.) How long did you work with a safety lamp before you began to have nystagmus?—Mine, perhaps, was a unique case. I was working in the solid cutting, a six-foot road, not in a wall, and my lamp had to hang back some three feet away from me to be out of danger, and the strain on the eye and the limited light I had caused nystagmus.

9573. How long did it take to develop the disease?—I should be developing it two years.

9574. Was the oscillation of the eye very considerable?—It was.

9575. Did the incapacitation gradually increase, or did it come on suddenly?—It came on gradually. My family called my attention to the fact that I was blinking my eyes, and when I came into a light I seemed to stagger.

9576. Would you say that the growth of the nystagmus and the incapacitation were parallel, that they went *pari passu*?—Scarcely so. I felt it growing on me, but I was able to do my work until I had to go to the manager eventually and say: "I cannot go on with this work any longer, the strain is too great on my eyes; I must have a different job." He saw it at once, and found me a different job.

9577. Would you agree that it would be very difficult from the inspection of a man's eyes to determine the degree of his nystagmus?—I quite agree.

9578. A man might have the oscillation of the eye considerably, and yet not be incapacitated?—Quite so.

9579. (Mr. Cunynghame.) It has been alleged that it is the turning up and the strained position of the eyes that causes the nystagmus. Do you agree with that?—No, I do not, because the man who works with a candle has the same thing to do.

9580. You maintain, do you, it is caused by the insufficiency of light?—Yes.

9581. Have you known of any cases in which men who had got nystagmus in using lamps have got cured by working with naked lights?—Many of them.

9582. Directly they got the naked light they improved, did they?—Yes, and eventually got cured; and even now to-day our club doctors, if they find men who have nystagmus badly order them out of the pit. We have doctors for each pit, we have what is known as our field clubs, and the men have doctors for themselves, their wives and children, and when the doctor finds a man in an advanced stage of nystagmus he orders him out of the pit, and he goes on to the bank for, say, three months.

9583. (Chairman.) Do you ever have a case in which a doctor tells a man to come out of a pit where safety lamps are used and go to a pit where candles are used?—We have very few candle pits now, but they order them on to the bank.

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9584. (*Mr. Cunynghame.*) Can you say how much light a miner's safety lamp gives in proportion to a naked torch? Do you think a miner's safety lamp gives less than one candle power of effective light?—Yes, by far, and it gets less. You see, your lamp gets dusty, and the light becomes more dim. We have had lamps tested when they have gone in clean and had them tested when they have come out, and the lighting power is considerably reduced.

9585. Whereas the torch gives about three candle power, the light of a safety lamp is a good deal less than one candle, is it not?—Yes.

9586. If there were electric lights used in mines of three or four candle power, and they were made to throw the light upward, do you think nystagmus would disappear?—Yes, and accidents from falls of the roofs and sides would considerably disappear.

9587. With regard to beat hand and beat knee, the Committee have had some evidence. Do you wish to say anything about it?—In our mines men have been ruined and unable to work by it.

9588. What do you call it in your district?—We call it housemaid's knee.

9589. Do you have any cases of men suffering from sprained wrist, not through accident, but coming on gradually?—Yes, and that prevails in the hard coal seams more than anywhere. I have known it ever since I have been a boy. You find men with straps and worsted tied round their wrists. I have had it myself, and it is brought on by working in the hard coal.

9590. Does it prevent men from doing any work at all?—Yes; at times for weeks.

9591. Do you think that it is simply due to their employment, or to a natural weakness of their wrists?—I think it is due to the nature of the coal. You do not find it among men working in soft coal.

9592. Is there any visible symptom of the strain on the wrist?—Sometimes it swells. The general custom with men who have it when they come home is to put their wrist under the tap and let the cold water run on it and bandage it; then they strap it up.

9593. (*Professor Allbutt.*) Is the incapacity due to weakness in the wrist or to pain in the wrist?—It is due to pain in the wrist.

9594. (*Chairman.*) Suppose that were scheduled for compensation under the Workmen's Compensation Act, how could anyone decide whether or not a man was incapacitated by it?—In some cases I am bound to say it would be very difficult. In some cases the wrist swells considerably; in others it does not.

9595. Might not it occur that a man who wanted a holiday on half wages would have a sprained wrist at that time?—I am pleased to say in our county we have never been charged with malingering.

9596. (*Professor Allbutt.*) Would you say that swelling or heat about the wrist would suggest rather an accident than a sprained condition?—I think not.

9597. You think it would be quite consistent with the slow and gradual strain, do you?—Yes.

9598. (*Chairman.*) Has your society considered what diseases and injuries ought to be scheduled under the Workmen's Compensation Act as regards miners?—Yes.

9599. And they did not include sprained wrist, did they?—They did not include sprained wrist, but we have it, and the Federation Board includes sprained wrist.

9600. In what way?—They have had the matter talked over, and we decided that it ought to be scheduled.

9601. We have heard no evidence on the subject of sprained wrist throughout the whole of our inquiry until to-day from Mr. Smillie. With regard to asthma and other lung complaints, do you think that miners suffer from phthisis or consumption through their employment?—I do not think so.

9602. Do you think that coal dust acts as an irritant to the lungs?—I do in the case of bronchitis.

9603. But it does not set up phthisis as steel dust does amongst grinders, you think?—I do not think it does.

9604. Do you think men suffer from bronchitis owing to breathing the dust or breathing the foul air,

or going from the heat into the cold?—That needs explanation. We have some mines which are worked at a fairly high temperature and with long travelling roads which are very dusty; the men perspire very freely, the dust gets on to their lungs, and I should say there are scores of cases which could be proved by the doctors in Derbyshire in which the miners suffer more as a class from bronchitis and asthma than anything else. Perhaps that is increased and intensified by the fact that some of the men have to go by mails as far as 5, 6 or 10 miles home after coming out of the hot atmosphere. We suffer more from bronchitis and asthma than anything else as a class.

9605. The symptoms of bronchitis in a miner are no different from the symptoms of bronchitis in anybody else, are they?—They are the same.

9606. In any given case suppose a man were claiming compensation under the Workmen's Compensation Act for asthma, would anyone be able to say whether or not that individual man got his complaint through his employment?—I do not know. I would not like to say "Yes" or "No" to that. I think it must be left to the doctors—the doctors know.

9607. They know whether or not the men got it through their employment, though the symptoms are just the same, do they?—A doctor in a village knows every man, and he knows every family, and he could tell.

9608. (*Professor Allbutt.*) Supposing a man to come before me as a medical referee, who said he had bronchitis—if it arose from breathing coal dust or foul gases it would be more or less specific to his employment, but on the other hand, if he had got it by coming out of the pit sweating, wet through, and walking home perhaps a couple of miles in the cold air, which I should consider not specific to his employment, how should I as a medical man be able to decide whether he got his bronchitis from one cause or the other?—I should consider that he was engaged in his work in going to and fro.

9609. But still there remains the difference in the causation, does there not?—Yes, but if he catches bronchitis or asthma, either in working in the pit or travelling to and from his work, it is in the nature of his employment.

9610. (*Chairman.*) Supposing I drive home in a hansom cab from the House of Commons on a cold night after getting heated in debate, and I do not put on an overcoat, and get an attack of some lung trouble should you say that was due to my employment?—Yes.

9611. Suppose I did the same thing coming home from the theatre?—That is another thing. The man is walking backward and forward to get a living; you are doing it for pleasure.

9612. (*Mr. Cunynghame.*) But he could put on a great coat if he liked. Has he a right to leave his great coat off and charge his complaint to a coalowner?—A great coat for a collier walking three miles is absolutely absurd from a practical standpoint.

9613. Men after playing football put on a great coat and tie mufflers round their necks; why cannot a collier do the same?—There is no comparison at all. Where is a man going to keep his coat?

9614. Cannot a man arrange to have his coat kept somewhere?—There is no such thing as an arrangement for a great coat at a colliery. A man takes what he has on him down into the pit and brings it up.

9615. Asthma is common to a great many other classes of the population, is it not?—Yes, but it prevails more amongst colliers than others.

9616. But with regard to respiratory diseases, miners are rather healthier; and as to phthisis, they have less phthisis than any other class of the population. Taking one thing with another they are decidedly as healthy as any other part of the population with regard to respiratory diseases, are they not?—No.

9617. They may have a little more bronchitis, but considerably less phthisis, have they not?—And more asthma.

9618. Yes, a little more bronchitis and asthma, but very much less phthisis. If you take it altogether, are not they as favourably situated with regard to respiratory diseases, taking phthisis and bronchitis together, as any part of the population?—I do not think so. I am now speaking from my experience and my knowledge of my own county and the Midlands. There is

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no class of workmen that suffers from bronchitis and asthma to the extent that miners do.

9619. And that could be prevented to a large extent by some reasonable system of great coats to put on after their work, could it not?—To some extent.

9620. I mean, if football players after football were to walk home without a muffler and great coat on they would get bronchitis too, would they not?—Perhaps so.

9621. It seems difficult to say, does it not, that it is due to the employment when it is really due to walking home without a great coat? Is not it rather unfair to say that it is due to the employment?—Then I have to create another difficulty for you to get over. Taking some of our large collieries, there are men who live close to the pit and who have no walking practically—when they get out of it they are in their houses in five or ten minutes—and they have it.

9622. But if you come up hot with a north-east wind blowing, five minutes is quite long enough to cause it, is it not? If it is reasonable to put on a coat

it may be reasonable, may it not, to put it on for five minutes?—Quite so, but the fact remains that we suffer from it extensively.

9623. And the Committee have to consider how far that can be called a disease due to the employment?—Yes; there must be that difficulty. I do not wish to underestimate the difficulty you have; I am only stating facts.

9624. (*Professor Allbutt.*) Supposing I were to instance the boating men in my own university; it is a very short way to the boathouse, but those strong young men of 20 years of age or so always put on jackets and mufflers round their necks the moment they get out of the boat?—I quite agree with you. After being in a hot temperature, walking a considerable distance perspiring freely as they do, if great coats were provided for them it might save many cases of bronchitis and asthma.

9625. (*Chairman.*) Are there any other points which you wish to lay before the Committee?—No.

Mr. A. C. J. WILSON, L.R.C.P., M.R.C.S., called and examined.

Mr. A. C. J. Wilson, L.R.C.P., M.R.C.S.

9626. (*Chairman.*) Are you Medical Officer of Health for the Thurlstone district?—Yes.

9627. And certifying Factory Surgeon for the Penistone district, and Medical Officer for the Penistone Union?—Yes.

9628. Is that a district in which there are ganister mines and works?—Yes.

9629. What is your opinion as to the existence of any disease amongst the miners and workers due to the inhalation of coal dust?—Part of my union district was taken off about the year 1895, but previous to 1895 I noticed in the district several cases of phthisis; in fact, I attended six cases which were, I think, probably due to ganister working. It was not so much known or talked about then as it is now, and at that time I looked upon it as you would look upon stonemason's phthisis. Since then, in the other part of my district, where my private practice has been, and where there are three ganister works, I have not come across any case which I should say was due to ganister work, although I have been in practice there for 30 years.

9630. Have you come across any cases of fibroid phthisis?—Not that I have particularly noticed. I could not tell you of any special case during the 30 years I have been there. Of course, one cannot remember everything.

9631. Have you made any post-mortem examinations?—No; I have never had a case to make one on.

9632. Are you of opinion that there are districts now contiguous to your district, but not part of it, in which the ganister disease is more prevalent?—I do not know it now, because that part of my district has been taken off my union and put on to another, and it is out of the range of my private practice. I only know it from report, and I know Dr. Robertshaw, who has reported upon these cases, very well.

9633. Have you any reason to think that ganister disease may be more prevalent in other places than in your own district?—Certainly.

9634. Are the works and mines in your district particularly well ventilated?—I have been over the mines in my district and they are all wet mines, which, of course, does away with liability to dust. The ganister works are chiefly out in the open air with just a roof on and open sides; so that there is plenty of ventilation.

9635. There is so much air flowing through that there is no dust for the men to inhale, I suppose?—Nothing except a little in summer. I should like to say that I visited Messrs. Hinchliffe's works last Tuesday, and also Messrs. Joel Bramall's works; I took

the trouble to examine some of the miners who had been working there some time, and I can give you the results. I took the men as they came out of the mine at three o'clock. The first was A., 24 years of age. He had been in the mine 12 years, five years at the ganister face; he fires his own shots. He had influenza two years ago; he has no anæmia, no cough, no shortness of breath, percussion normal, no vocal fremitus, respiration normal, was perfectly sound, and is a football player. The next case was B., 57 years of age, and he had worked in the mine for 39 years; for 24 years he had worked at the ganister in the mine, and for eight years had been grinding ganister. He had an affection of the eyes nine years since, which kept him away from work 12 months. There was no anæmia, no shortness of breath; he has not been ill during the last eight years; he has used dynamite in the pit; he has had two attacks of influenza. The movement of the chest is fairly good, no vocal fremitus, percussion normal, respiration at the apices normal, but râles heard in front at the lower lobe of each lung, respiration at the back of the chest good, chest measurement on expiration 37 inches, inspiration 38 inches; takes a quantity of alcohol, and, in fact, gets drunk nearly every week. For that man to have been in a mine 39 years, and to have no signs except a little weakness in front of each lung, is rather remarkable. The next case is that of C., 34 years of age, and working 22 years in the pit. He has worked underground at ganister all the time, and never been ill; has no shortness of breath, no anæmia, and no cough; the chest movement was good; no vocal fremitus, no dullness on percussion; respiration normal both in front and at back of the lung; chest measurement on expiration 37½ inches, and on inspiration 38½ inches; has been a football player. Those were the first three men I examined as they came out of the pit at Hinchliffe's works. That is a wet mine. Then I went to Messrs. Bramall's works, where the grinding is done in the open air, so that except in the summer there did not seem to be much danger. I examined a man who had been there the longest time—D., 42 years of age, has been 21 years at work, healthy-looking man with red face, no shortness of breath, no vocal fremitus, percussion normal, respiration normal, and never had any illness. There seemed so little fear of anything at that mine that I only examined him, as he had been there longer than anybody else. At Messrs. Hinchliffe's I asked them to give me a list of their workers, their ages, and the length of time they worked in the mine. All these are private patients of mine, and I cannot say that I know of a single case of fibroid phthisis amongst them.

9636. Was that a wet mine also?—Yes.

Mr. ERNEST NEELE, called and examined.

Mr. E. Neele.

9637. (*Chairman.*) Are you a slate quarry owner?—No; I am the general manager of the Dinorwic Quarry, in Carnarvonshire. The quarry is owned by Mr. Assheton Smith.

9638. How many men are there employed there?—Roughly, 3,000.

9639. Have you works there for preparing the slates in all stages?—For roofing and slabs.

9640. Have you got any mills?—Yes, a few.

9641. About how many men would be employed in the mills?—About 150, perhaps.

9642. Is there much dust in those mills?—There is a certain amount of dust.

9643. Do you find the men employed in those mills suffering from lung diseases?—No.

9644. Do not you have any cases, or any remarkable number of cases, of phthisis amongst them?—No, certainly not. I do not know whether I ought to qualify that. There is distinctly an amount of phthisis, which is consumption, in the district. That is a fact, and there is no doubt about it.

9645. Do you think the slate dust in the quarry or in the mills gives rise to any lung disease?—I do not think so.

9646. Have you any statistics of any sick club or other organisation?—No; there is a hospital at the quarry, entirely maintained by Mr. Assheton Smith, and a resident doctor there.

9647. There has been some evidence given to the effect that slate dust does give rise to lung diseases. Have you any arguments to lay before the Committee why that disease should not be scheduled for compensation under the Workmen's Compensation Act?—The only argument I have is that the quarryman lives to a great age, and I have never heard the complaint made, and I really do not think it is so. But, of course, I am not a medical man. I do not know whether the Committee have seen the minutes of the evidence which was taken at the Departmental Inquiry in 1895 before Mr. Le Neve Foster, which distinctly showed that without a post-mortem it could not be proved that any slate dust entered the lungs.

9648. And what you say applies not only to the quarrymen, but also to the workers in the mills, does it?—Yes; the mills only form a small part of the work. I have only lately erected two large mills which are being worked with electricity, but before that there were only 16 tables.

9649. Is any precaution taken to prevent the dust in the mills pervading the air and entering the lungs of the workers?—No. The quarryman, for his own purposes and to keep his saw cool, has a little water running on the teeth of the saw, which has the effect also of laying the dust which that saw is throwing up. I venture to say that anyone could walk through either of the mills and not be conscious of the dust unless there was a big gust of wind.

9650. Is the mill enclosed, or is it open at the sides?—There are open doors, and men passing in and out the whole time. One man might have a block on his table working at it, and another man may be bringing in a block close to him; so that there is any amount of fresh air.

9651. (*Mr. Cunynghame.*) According to your description, from the few men you have employed and the water that is used, one would hardly expect to find much asthma or bronchitis or phthisis among your men. But supposing that water was not used with the saws, and there was a good deal of dust about in the mills, you might expect to find those complaints, would you not?—Of course I cannot say as to that; I only go by what I know.

9652. By reputation, dust in slate factories is said to be dangerous?—I have heard the statement made, but I have no proof of it.

9653. There is a general opinion, is there not, that it is dangerous?—I have never heard the word dangerous applied to it. I have heard that the slate dust will get into the lungs, and no foreign substance is good for the lung.

9654. Your arguments rather seem to me to make a case for considering there is no danger in your mills rather than no danger in mills in general. Your evidence is rather confined to your own mills and your own quarries, is it not?—That is all I have knowledge of.

9655. You would not be prepared to say there is no danger in general, would you?—I know nothing about other mills.

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9656. Apart from your experience, a case might be made out for scheduling the disease, might it not?—The conditions may be different, but as far as I am concerned I should say there is no risk. I have 79 pensioners, some of whom have been in the mills, and some working in the rock, and their average age is 72, so that is pretty good proof of what I say.

9657. Supposing it was shown that in other mills there was a certain amount of respiratory disease from the slate dust and the disease were scheduled, I do not see how it would hurt you much?—I should suffer, should I not?

9658. Why would you if none of your men contract the disease?—Human nature is human nature, and a man might say, "I have this disease from the slate dust"—there is that danger.

9659. There is. A man might say so, but it might be a very difficult thing to convince a doctor it was so?—But I fancy it would be a very difficult thing to prove to any judge it was not so.

9660. Your view is that it is a case in which the burden of proof should be on the man, is it?—I think so, because of the healthy appearance of the quarryman generally. If he gets past 40 he lives to a great age. Only a few days ago I pensioned a man who has worked 73 years in the quarry, so that it cannot be an unhealthy employment, I think.

9661. Not as a whole; but dressing the slate is, is it not? From your point of view, if the burden of proof were thrown on the man and not on the employer, it would not hurt you much, would it?—You used the words "dressing the slate." That is different to a saw mill. In dressing the slate the men live to a great age, and you never hear any complaint.

9662. If the burden of proof was thrown upon the man there would not be very much danger of improper claims being made, so far as your own factory was concerned, at all events, would there?—I am afraid I do not agree.

9663. Even though the burden of proof were on the man, and the presumption in favour of the employer, and the man had to make out his case affirmatively, would you be afraid?—I would not be afraid; I should like to see justice done to the men as well as to the employer. Of course, if the burden of proof is thrown on the man, you really do assist the employer, to a certain extent.

9664. In the case of lead, for instance, the burden of proof is on the employer. If a man is poisoned the employer has to show that the man could not have been poisoned in his works; but supposing it were the reverse with regard to slate, it would not hurt you much, would it?—If the workman was an honest man and the burden of proof lay on him, I do not think he could prove his case.

9665. Then it would not hurt you?—It would not under those conditions.

9666. (*Dr. Legge.*) The medical men practising there say they find symptoms amongst the men employed in the slate mills and exposed to dust quite different from the symptoms of chronic bronchitis, and so on, in the general population; if that were so they could say definitely whether any disease was due to the dust or not?—If they made that statement, I presume they can, but it is news to me.

9667. In that case it would help your position by making it more certain whether the award would be a right one or not?—Yes, if that is so; but the doctor who gave evidence at the inquiry I have referred to in 1895 said that he could not prove it without a post-mortem.

THIRTY-THIRD DAY.

Monday, 25th March 1907.

PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. J. OWNER, called and examined.

Mr. J. Owner. 9670. (*Chairman.*) Are you an Inspector of Factories?—Yes.

25 Mar. 1907. 9671. Have you been so for some eight years?—Yes.

9672. Are you able to tell the Committee something about poisoning from chrysoidine?—Yes.

9673. When was it you made an inquiry into this question?—In the latter few months of 1902 and the commencing months of 1903, in the Bristol district.

9674. What is chrysoidine used for?—It is used for colouring the soles of the commoner varieties of boots.

9675. What does it consist of?—Chrysoidine is one of the benzene derivatives; its actual title is meta-diamido-benzene, and it has the chemical formula C 12, H 12 N. It is a very yellowish fine crystalline powder, and the usual method of application is to take about an ounce of the chrysidene powder and mix it in half a pint of hot water, then to that solution is added a small quantity of oxalic acid.

9676. How is it applied?—The solution, when cold, is applied to the sole of a boot by either a piece of rag or brush. That results in giving the sole of the boot a very vivid colouring; it brings it to almost a crimson colour—a very light red.

9677. Whereabouts did you make your inquiries?—In the Bristol district in the factories, and also amongst some of the outworkers engaged by the factories.

9678. Did you find any cases of injury to health from the use of this substance?—There were several cases which I found had been definitely treated in the Poor Law Infirmary at Bristol. The patients had been attended by Dr. Norgate, who was then in charge; and I also found several men working in the factories who had suffered from ulceration of the arms and eruptions on the arms and hands.

9679. Did they all attribute their ailments to the use of the substance?—Yes.

9680. Did your investigations confirm that?—So far as I was able to ascertain, the statements of the men were quite corroborative of each other. They all showed the same symptoms—irritation from the splashes of the liquor, and subsequent eruptions of the forearms, particularly in the joints.

9681. Were they incapacitated for any length of time from working?—Several of them, I ascertained, had been detained from work as long as a month owing to their inability to use their arms in the work.

9682. Were no similar symptoms found in other men engaged in that occupation, but who were not using chrysoidene?—No, there was no similar symptoms among workers in departments where it was not in use.

9683. Have you come across many similar symptoms anywhere else?—No; the Bristol district was the only district I have been to where boots are made to any extent.

9684. (*Mr. Cunyngame.*) What is the use of making the soles of boots a bright red colour?—There is a demand for that particular colour, I believe, and it is used principally on the poorer qualities of boots to give them a better appearance.

9685. Is it used on boots for exportation at all;

do you know whether we export boots to any extent?—I should rather think these were the heavy class of boots used in this country.

9686. Why should not the whole thing be absolutely forbidden as dangerous to health?—I cannot give any trade reason why it should not. They use other stains for other boots, but they have not found a stain which will give this particular shade.

9687. I can imagine some dangerous chemicals being used in trades because the article could not be made without them; but does not it seem rather extravagant to give a delicate particular shade to a common quality of boots, and to use something poisonous to do it?—Yes, it does.

9688. It is not as if any export would be lost by the disuse of it?—I do not think there is any large exportation of these boots.

9689. (*Dr. Legge.*) Was all the illness that you saw of an eczematous character?—Yes.

9690. When you speak of the joints being affected, do you mean the folds at the joints?—Yes.

9691. Did you find that the arm-pits were also affected?—Some of the men complained of swellings in the under part of the arms, which they put down to the poison.

9692. Have you actually seen the eruptions?—Yes. I cannot say that I ever saw a man with the swelling, but I have actually seen the eruptions on the arms and hands.

9693. Were they rashes or were they ulcers?—They looked more like ulcers to me. They were suppurating and sore when I saw them.

9694. Do you know what the symptoms of dinitrobenzol poisoning are?—No.

9695. Were there any constitutional symptoms in the men you saw?—Not when I saw them.

9696. You referred to oxalic acid. Do you think that plays any part in the poisoning?—I do not think so. I think the quantity used is very small.

9697. Do you know any industries in which oxalic acid is used on a very large scale without producing symptoms of illness; in the dyeing trade, for instance?—No.

9698. (*Chairman.*) Turning now to your evidence on diseases from which dock-workers suffer in discharging dusty cargoes, where were you able to investigate that subject?—At Hull, since September last year.

9699. What cargoes do you think specially cause illness?—Grain cargoes generally, Russian and American wheat, rape seed, barley, and cotton seed; and in the Indian linseed there is a large quantity of dust.

9700. Is there dust in any other cargoes besides grain cargoes?—Yes, in the dry phosphates—that come in in bulk and in the metalliferous ores.

9701. Do you attribute illnesses from all these cargoes to the dust in them?—Yes.

9702. What symptoms do the men show?—They have very marked bronchitis; the chest is affected so that they become physically unable to work, and they have to be treated and remain away from work at least ten to fourteen days, in order to partially recover.

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9703. Do they then come back again and work for a period, and get ill again?—Yes.

9704. Does it become chronic after a time?—Yes. In the month of February there was a fatal case of phthisis to one of the workers. He had never worked anywhere else except in the discharging of grain. He was a man 38 years of age, and his doctor told me that he had been careful to eliminate all history of consumption, that he was convinced himself that the man's death was due entirely to the irritation set up by the dust.

9705. Do you know whether it was a case of fibroid phthisis or tubercular phthisis?—I could not say that.

9706. These men, I suppose, work first for one firm, and then for another?—Yes.

9707. Have you considered at all on whom the burden should fall of compensating them in case they are ill?—In the case of a number of workers at Hull, the work is done by the North-Eastern Railway Company, who have a number of men working in the grain permanently.

9708. So that if a man got ill would it be fair to say the North-Eastern Railway Company should pay compensation?—Yes, amongst their regular men.

9709. What about the casual workers?—With regard to the casual workers, a very large proportion of them work for one stevedore; each stevedore has his general hands, and engages casual hands when his own hands are insufficient to cope with the work at the time.

9710. They work for some years, do they, in that way for one man?—Yes.

9711. Have you any experience of the London Docks?—Not with regard to grain.

9712. Then you are clearly of opinion that these men do suffer in health from their employment, and that there is an industrial disease amongst dock labourers due to dusty cargoes?—Certainly.

9713. Do they suffer from any other ailments than those of the respiratory system?—In the barley cargoes the men do certainly suffer seriously from itch, and in phosphate and ore cargoes, particularly ore cargoes, the symptoms are that after a few hours' work in ore, a man is taken with violent sneezing, followed by bleeding at the nose, and he has to cease work.

9714. Are the men who suffer from itch prevented from continuing their employment?—Yes.

9715. They are away from work altogether, are they?—Yes, for many days at a time; in fact, the medical officer who examines the recruits at Hull told me he had had to refuse a large number whom he found suffering from itch, and practically in every case the men said the cause of the itch was working amongst grain cargoes, generally barley.

9716. Would it be possible to determine in any given case whether the itch from which a man suffered was due to his employment or not?—The medical man was of opinion that he could distinguish.

9717. And they would be prevented from working for a period of more than a week, would they?—Yes, certainly.

9718. Under treatment, would they recover?—Yes.

9719. Are the men who suffer from bleeding from the nose by working among the ore or phosphate cargoes prevented from working for a period of a week or more?—I could not say that definitely. The inquiries that I have made show that in the case of new men the bleeding is so serious that they have refused to work again in ore; but there seemed to be a fair number of experienced men, men who have become somewhat acclimatised to the conditions, who are able to work for longer periods; but when they get a particularly bad cargo, they frequently find, even with experienced men, they have to damp down the whole of the cargo on account of the dust, and that they have to line the baskets in which the ore is taken up to prevent its getting through the wicker work; and even then, they find with experienced men they have to change the hands engaged a large number of times a day.

9720. Do you know of any cases in which such men working in those cargoes are kept away from any form of employment for a week or more?—No; I have not traced a single case at present.

9721. (*Professor Allbutt.*) Are you prepared to give technical medical details?—No.

9722. I suppose there are medical men in Hull who have seen these cases, and who know all about them?—Yes.

9723. Can you suggest the names of any medical men who are familiar with them?—Yes. Dr. J. G. McWillie, of Hedon Road, is one.

9724. I suppose it is inorganic dust in some cases, and organic dust in others, which is mixed with the grain cargoes? Which do you think it is mostly?—It is very largely inorganic dust.

9725. May it be put roughly under this head?—Yes; I think the inorganic dust is much more serious than the organic dust.

9726. Cargoes are wholly hand-discharged, not machine-discharged, I suppose?—There is no machine discharging whatever. The procedure at Hull with regard to the wheat cargoes, which are particularly complained of by the men, is this—the Kurrachee wheat arrives at Hull in the ships in bags, and the custom is for each merchant to bring his own craft alongside the ship. They have some ancient rights there, by which the smaller craft do not pay dock dues, and the merchant, in order to unload expeditiously, has the bag cut, and then the wheat is shot into a short hopper with an equally short spout, the result being that as the wheat passes down the hopper into the barge the air winnows it to a certain extent, and blows the dust into the faces of the men.

9727. By this process more dust is caused?—Yes.

9728. Do you know of any existing machinery by which these conditions could be modified, either by way of fans or closed boxes?—Of course, in dealing with bulk cargoes in the West of England they are largely discharged by either mechanical elevators or by pneumatic suction plants.

9729. Do you see any difficulty in this process being applied to such cargoes in Hull?—I am told that the custom of the port is almost such as to prevent their use. But I have been there such a short time that I would not like to express a definite opinion on the point. It is certain that the mechanical appliances in use in other ports are not in use at Hull.

9730. But you think them necessary, I take it, and that the adverse conditions prevailing in other places are very much less than in Hull?—Quite so.

9731. (*Mr. Cunynghame.*) With regard to itch from barley cargoes, is that a parasite? Do you know anything about that point?—I am afraid I know very little about it, except that the doctors have told me that there is itch caused by mechanical irritation, and itch caused by a parasite. They say there are two kinds of itch.

9732. I should imagine the only itch got from the grain cargo is the mechanical itch, because a man might get itch in quite a different way, might he not?—Yes. I have not examined any man who has had it, and even if I had I am afraid my medical knowledge is not sufficient for me to judge. I only mentioned it because the information has come to my knowledge, and the men themselves feel very strongly about it.

9733. With regard to phthisis and bronchitis among dock labourers, are there any statistics showing that they are worse off than the rest of the population?—There are none so far as Hull is concerned. I have made inquiries from the Medical Officer of Health, and although his records show a very large death-rate from chest complaints amongst the inhabitants of Hull, he has not any definite statistics as regards the dock labourers.

9734. If we are in the face of a very large death-rate from phthisis and bronchitis in Hull generally, the point that you have to make is to show that the dock labourers have an unusual excess of it, is it not? It rather weakens the case for dock labourers if you show that in the whole town the phthisis and bronchitis death-rate is large, does it not?—It does. The only answer I can make to that is that the doctors tell me the chest complaints from which their patients suffer are distinguishable definitely by the sputum of the patients.

9735. They have examined the sputum, have they,

Mr. J. Owner. and found dust in it?—I think Dr. McWillie will tell you he has made definite examination into the matter

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9737. But some dusts, you know, do not set up any injury at all—coal dust for instance?—Quite so; I have made inquiries amongst colliers, and cannot find any injury. They are a separate class of men altogether, and never work in the grain trade.

9738. They load coal, I suppose?—Yes, the trimmers do.

9739. Those trimmers do not suffer from bronchitis and phthisis, then?—I have not been able to trace any injury amongst them.

9740. Is there any other kind of cargo you can mention where it is not injurious?—I think not.

9741. Do you get any flour that has been milled coming to Hull?—There is some importation of flour.

9742. That comes in sacks, I suppose?—354,000 cwt. came in sacks last year.

9743. Is there any dust coming off from that?—Very little.

9744. (Dr. Legge.) In these grain cargoes, do you know what the principal constituent is of the inorganic dust?—It is very largely silicious matter.

9745-7. Is there much dressing of grain done in connection with the unloading of vessels at Hull?—There is a very large flour industry there, and, of course, they dress the grain in the larger factories; but,

generally speaking, they have fairly good plants for dealing with it when it gets to the factory itself.

9748. Do you mean for dust extraction?—Yes; washing and brushing and cleaning it.

9749. Even supposing you had pneumatic elevators, or other kinds of elevators, there is still the shovelling of the material into the elevators to be done, is there not?—Some shovelling has to be done when you get to the bottom of the cargo, but it is very little when compared with the amount of labour now required.

9750. Where have you seen these elevators?—They have a large pneumatic elevator at Sharpness for linseed, maize, and wheat in bulk.

9751. Have you seen them anywhere else?—No; they have mechanical elevators at Bristol, but they are the ordinary type of bucket elevator.

9752. Would it be possible, do you think, to have some fan or duct in connection with the unloading of grain cargoes?—At present I do not see how it could be arranged.

9753. (Chairman.) Have you come across in your experience as a factory inspector any other little known industrial disease, such as chrysoidine poisoning?—No; I think the only other case of serious injury was a case of mercurial poisoning at Brighton some few years ago.

9754. (Dr. Legge.) Are the workmen in Hull of opinion that arsenic is added to the wheat?—They think arsenic is added to the wheat, and they think that injuriously affects them in addition to the dust. My own view is that it is merely a dressing put on the wheat.

Mr. J. G. ASHMORE, called and examined.

Mr. J. G. Ashmore. 9755. (Chairman.) Are you the secretary and manager of the Oakeley slate quarries at Blaenau-Festiniog?—Yes.

9756. Have you been there many years?—I have been connected with the quarry for thirty-three years as secretary, and since 1896 I have been the secretary and manager.

9757. Are there many men employed there?—I appear to-day on behalf of the Festiniog Quarries Association, which is an Association formed to protect the interests of all slate quarries in the Festiniog district, and the Association between them, which consists of thirteen quarries, employ 3,216 men, or, at any rate, that was the number employed at the end of last year. Since then two quarries have closed down.

9758. Does that number include men engaged in quarrying and in the mills?—Yes.

9759. How many men would be employed in the mills?—I cannot tell you that. As a matter of fact, I have hardly had time to go sufficiently over the whole employees of the quarries to give you a complete return. I can give you the figures of our own quarry—one-third of the men there are employed in the mills.

9760. In your own quarry how many men are employed in the mills?—I have drawn up a specification of each of the mills, with the number of men employed in each, and giving the average cubical contents for each man and boy employed. The total will be 7,867 cubic feet to each man and boy employed in the mills in the Oakeley slate quarries. Of a total of 1,070 employed there, 338 are employed in the mills.

9761. How many mills have you?—Altogether we have ten mills and one slab mill. I have not included the slab mill in the average of cubic feet, owing to the fact that we only have three men in the mill, and as it is the largest mill of the lot it would have brought out the average very much in our favour.

9762. The work carried on in the mills is sawing and dressing slates, is it?—Sawing, splitting, and dressing slates.

9763. Is there much dust evolved in those processes?—There is practically no dust evolved in the sawing processes, because all the saws are run in water troughs, and in the dressing of the slate itself large portions are cut off, and there would be a little dust arising from that process, no doubt, but it is comparatively small—in fact, infinitesimal. I have a book of photographs here, which will give the Committee

some idea of what the work is. This is a photograph of one of our mills where the slate splitter is shown at work, and its clear definition will show you the general conditions of the air in those places. The photographs were taken when the men were at work.

9764. Do you have many cases amongst your men of phthisis or other diseases of the respiratory system?—It is a disease rife in the district, not only amongst the quarrymen, but amongst the whole residents in the district—phthisis and other diseases of the respiratory organs, brought about very largely, in my opinion, by the climatic conditions.

9765. Have you any statistics showing the comparative incidence of these diseases amongst the population generally, and among quarry workers in particular?—I have not been able to obtain those figures, but I think it is only necessary to refer you to Dr. Richard Jones's report. We, as representing the quarry owners at Festiniog, were not able to get an independent doctor to come before you to-day, because all the doctors in the district are paid, and are in the employ of the men—not that we wish to suggest for a single moment that the doctors who come before you would give anything but fair evidence, but as a matter of fact the doctors are all employed by the men in the district, and we are not able to get a doctor who has any sufficient knowledge of the subject to bring him before you. Therefore it is very difficult, from our point of view, to put the proper medical position before you. But we are prepared to take Dr. Richard Jones's evidence as being quite fair and straightforward as given in the Report of the Departmental Committee upon Merionethshire Slate Mines, dated 1893-95, which you have doubtless had before you.

9766. Have there been any changes since then in this particular?—No, I know of none, with the exception, I think, that every quarry has spent a great deal of money on the general improvement of the conditions of their workers. Quarrymen have to be practically grown from boys, and it is therefore to the employers' interest to do the best they can to keep them in a healthy condition and prolong their lives.

9767. Have you any statistics with regard to the physical condition of your workers which you could lay before the Committee?—I can give you the death rate in our own quarry. The general death rate, including all diseases, but apart from accidents, has been 10·84 per thousand amongst those we have employed from 1900 to 1906—amongst the whole body of the workers—and from phthisis alone it has been 1·91

per thousand among quarrymen, including mill workers.

9768-9. Do you find more cases of phthisis amongst the mill workers than amongst the other men?—That is a question I am not in a position to answer. You see, we have a large body of men. Immediately I heard you would perhaps care to have some evidence I sent for particulars, but they have been unable to complete them. The Registrars have not been able to give us a complete list of the deaths in the time at our disposal, and it has been difficult to get anything which is conclusive as between the two classes of workmen; therefore, unless I was able to give you the exact figures, it would be no use giving a figure which would lead to a wrong conclusion.

9770. (*Dr. Legge.*) Have you a list of the deaths?—Yes. You will find this list with the red ink marks is a list we sent to the Registrar with the idea of completing previous lists, but it has not been completed in every respect. Those are lists of deaths in our own works, and we employ one-third of the quarrymen in the district.

9771. (*Chairman.*) Then, in your opinion, there is no disease amongst quarry workers which can be properly attributed to their employment?—It would be a very difficult thing for me to say that from a medical point of view. I can only say that up to the present time there has been no proof of phthisis being brought about by slate dust; that is to say, there has been no post-mortem, and looking at the thing as a layman I cannot see how one is going to differentiate between fibroid phthisis and tuberculous phthisis unless by post-mortem, and if the disease is one attached to the schedule, of course it means a post-mortem on every-one dying from tuberculosis.

9772. (*Mr. Cunynghame.*) Is part of the work of cutting the slate done underground?—Yes.

9773. Is the work of cutting slate done by bore-holes and blasting?—Yes.

9774. Do you bore holes wet?—Very often, but not all wet.

9775. In the making of bore-holes in the dry and underground away from the air, are not you aware that the dust is very injurious?—The channelling is bored wet, and in that photograph where you see all the men together, the boring is wet, but in most cases of old-fashioned hand driving in the headings or levels it is dry; there are generally only one or two men in the chambers, which may be anything from 160 ft. high by 60 ft. wide.

9776. There is no artificial ventilation, is there?—Yes, there is compressed air brought in.

9777. You would have rather expected to find some of the men who are boring suffering from the effects of dry dust, would you not?—We do not find it so, the general conditions of the work are so humid.

9778. Is the face of the rock naturally wet?—Yes.

9779. At all events it is so in your quarry?—Yes. In some it is so, and in others it is not, but in most of the quarries in the Festiniog district there is moisture on the face of the rock. There are a few chambers where it is dry, but there is percolation from the roofs.

9780. Why do you saw in water-troughs?—That is to a large extent in order to cool the saws, and we find they do much better work.

9781. It is not then on account of dust arising?—No, it is not done to prevent that, although, of course, there was a period when water was not used; but it was found the wear and tear of the saws was so great that they did far better work in the water.

9782. (*Chairman.*) When water was not used, was there more effect on the health of the workers?—I cannot tell you. I do not think very correct registers were kept in those days.

9783. (*Mr. Cunynghame.*) Have you registers now?—Yes.

9784. Do they show a difference between the death rates from phthisis and bronchitis of women and men respectively?—We have not a register kept of women and men, but we generally take a note in the quarries themselves as to our own men.

9785. Are not their regular returns kept in the district?—Yes, by the Registrar.

9786. Would they show the difference between

women and men, or have you gone into it?—I have not. Of course, I can only go on what the doctors say there; they are inclined to think there is a good deal more phthisis among women and children than there is among the men, and that they say is very largely owing to the conditions of their homes—the want of proper ventilation. As I dare say you saw Mr. Lloyd-George said the other day, if they knocked a pane out of the window in each room the conditions would be far healthier. I have been many and many a time in the district, and, out of curiosity, I have tried to count in half a mile of small cottages how many windows were open on a beautiful day, and not one of them was found open.

9787. (*Professor Allbutt.*) And the owners of those cottages were in work and getting good pay?—Yes.

9788. Do you remember what month of the year that was?—It would be in May.

9789. And it is a little chilly in May, is it not?—Yes; but I have been often there without an overcoat, and found it quite hot, though, of course, you may get a week of that kind of weather, and then get some very trying weather. We have put 18 dining-rooms up in the quarries for the comfort of the men, and drying rooms where they can dry their clothes if they choose to do so, and we have ventilated the quarry with compressed air, and, in fact, generally everything that one can possibly do to meet their general comfort has been done. We find, of course, it is far better to have a healthy, contented, comfortable workman than to have a man ground down to the last point, and I think what applies to our quarry applies to all the quarries. I was going to say that looking at the question in accordance with the reference which has been made to you, that if you in your wisdom see fit to add phthisis to the Act, it seems to me it will be a very great hardship upon the men, because it would necessitate, in the first instance, I am sure, all the quarries under the present conditions of the trade having a very careful examination of the men who are now in their employ, and I am afraid it might lead to dismissal in many cases, for the simple reason that most of us in the trade are at present carrying on our quarries more or less on philanthropic lines. There is little or no profit attaching to the business, and one quarry which employed 200 men closed down last Saturday week, and we could all do with less men. Then, again, it would necessitate our having any men we took on in the future being duly certified, and probably we should have to go back some little distance into their family history. So that altogether it seems to me it would be a hardship on both of us, because on the one hand it is most difficult to say what the phthisis arises from, whether it is from a man's avocation or not. I do not think any man can distinguish it as a disease "properly attributable" to slate quarrying, and that is the whole point, I think.

9790. (*Chairman.*) Would those remarks of yours apply to the inclusion of fibroid phthisis only, as distinct from tubercular phthisis?—Of course, that is the particular disease which would no doubt be applicable to slate dust, but the difficulty to my mind is how it is going to be proved.

9791. If the burden were thrown upon the workman to prove that he had fibroid phthisis, and had contracted it in his employment, do you think the employers would mind paying if it were proved?—I do not think so for a moment if that were so; but I do say, if it is included, it is perfectly certain we should have to pay a premium to the insurance companies for the risk, and it is perfectly certain that everybody who dies from consumption, or any complaint of the kind, will claim under the Act for compensation.

9792. But, as you know, before a claim can be made it must be certified by the certifying surgeon, and from him there would be an appeal to a medical referee as to whether a man was definitely suffering from the disease. In the diseases now included in the schedule the burden of disproof falls on the employer, but there is power in the hands of the Secretary of State to cast the burden of proof upon the workman. If you had first of all the certificate of the certifying surgeon, then the certificate of the referee, and, thirdly, the burden of proof thrown on the workmen, do you think your objection to the inclusion of the disease would still be as strong?—I think we should still have to pay a very considerable sum to the insurance companies, because they

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know perfectly well the climatic conditions; they have had a wide experience already under the existing Compensation Act in reference to the general character of the employment, and there is no doubt they would charge us a pretty high premium, and I think any extra burden on the industry at the present time would be a very serious matter. It really would mean in some cases a matter of £200 to £250 on the premium, which in the case of some of the quarries would mean shutting down. We are all now, as a matter of fact, passing through a period of great depression. There is hardly one quarry in the Festiniog district which is really paying at the present time. I may tell you that under the present Compensation Act our premium comes to nearly 1 per cent. on the capital of the company. We are paying 30s. per cent. now on the wage, and in July, when the new Act comes into force, we are told to anticipate a very considerable addition to that charge, quite apart from any scheduled diseases that the Government may think fit to enforce.

9793. (Mr. Cunynghame.) What is the reason why the slate trade is so bad now?—It has been largely brought about by the foreign competition. We have had more slates brought in from France and America than we produce, and they have been sold at very low prices. We have reduced our prices to meet this, and the result is that we have had to reduce the wages *pro rata*, and the men consequently are leaving the country. I have an extract here from the "Cambrian News" of March 22nd, which I will read:—"Emigration.—It is calculated that during the past two years over 400 people have emigrated from the Festiniog district to America, over 500 to South Wales, and close upon 200 to Durham and district. Quite 100 workmen are booked to leave for America during the next few weeks." That is the condition of our industry at the present moment, and, as I say, another quarry shut down which employed 200 men last Saturday week.

9794. (Chairman.) You say that you provide drying rooms for the men?—Yes.

9795. How do they get their clothes wet?—Many of the men work in the open, and on each of the floors, where there are any number of men working, we have a drying room, where they can go and change and sit down and have a snack of food.

9796. Do they use the drying rooms?—Yes.

9797. Do you find any men who still go home with their clothes damp?—Yes. It is so difficult to get even from the quarry to the station at times without being nearly drowned, when you consider the heavy rainfall.

9798. (Professor Allbutt.) What is the distance?—It would be a good 20 to 25 minutes' walk from the quarry to the station, according to what part of the quarry the men are employed at. I should very much like the Committee to see the conditions under which the men work before making up their minds on their report, because I feel quite satisfied if you saw the conditions under which they work—they are quite ideal—you get more dust going along a country road behind a motor-car in five minutes than you would get in our mills in six months, and I should think it would be more heavily laden with fruitful germs. If I may, I should like to put in a short description of the quarry, giving details of the system of working at Festiniog.

9799. Respiratory diseases are contracted in your district, I take it, but rather in the form of acute pneumonia, as well as, of course, tuberculous consumption?—Quite so.

9800. But not as to chronic bronchitic ailments or asthma, I take it?—We have a fair number of cases of asthma, too.

9801. In the district in which your quarries are situated, being in the West of England, and the climate being a comparatively mild one, you would not anticipate much chronic pulmonary disease, would you. It is an equable, mild climate as compared with the East of England, is it not?—No, it is particularly cold up in the mountains there. The actual works extend from 700 to 1,400 feet above the sea level, and when the men are working up in the higher levels, as many of them do in the course of a day, they are very exposed, and it is bitterly cold there. It is in the Snowdon range, North Wales.

9802. That might very well favour pneumonia; but,

generally speaking, it is rather favourable to the pulmonary organs, is it not?—It might be so in some cases.

9803. Tuberculous phthisis is a different disease from chronic pulmonary disease due to dust?—Quite so. As a matter of fact, on that point, if the Committee would allow me, I would rather not express an opinion, because I have no medical knowledge. My only fear is this: If these claims come, and this proof has to be made, I do not see, personally, how one can prove this except by post-mortem. Then, if you have to cut up everybody that dies in the district from diseases of this kind there will be trouble. I know how the Welshmen look upon these matters.

9804. There are post-mortems of sufficient frequency to establish a doctrine on the subject, so that we are able to apply knowledge to particular cases in your particular district without requiring examinations in all cases?—Has a post-mortem examination ever been held on a slate miner?

9805. Yes, we have at any rate notes of two in the Carnarvon district. And what would make the danger greater would be, would it not, that the slate dust contains a large number of fine silicious spicules?—Yes.

9806. So, you see, even if there had been no post-mortems on slate quarriers, but post-mortems on other persons breathing silicious particles, the body of evidence would be considerable?—That may be so.

9807. From this, and from the well-known clinical symptoms, I think there would be no difficulty in discriminating between tuberculous consumption and what we have been accustomed to call fibrosis and chronic bronchitis?—It presents a difficulty to me which I rather anticipate—in every case they would immediately make a claim; but if you protect us on the lines suggested by your Chairman and make it incumbent on the representatives of the men to prove the case, it would relieve us decidedly.

9808. It is quite true that any change of law which affects many interests must for a short time give rise to cases of question and doubt, but within a short time these matters settle themselves, do they not, and the lines of discrimination become distinct and recognisable by any expert? Without saying for a moment what the Committee will do, it is well to consider the very important differences of this kind. With regard to the larger proportion of phthisis between women and men, this seems to me to be, in part, at any rate, due to the infection in the houses, does it not?—Probably that would be so. And it shows the disease is generally rife in the district, which, I think, is brought about by the climatic conditions. I should like to put in this table of the rainfall. It varies from 69.81 to 135.13 inches per annum, and the number of wet days was 239 out of 365 on the average.

9809. I find in the statistics you have put in only one entry of fibroid phthisis?—That is so, and the question in my mind is how they arrived at that one case, because there was no post-mortem.

9810. I venture to suggest that a post-mortem examination may have been as little necessary to ascertain if one had died of typhoid fever or not. The Welsh quarrymen are a very clannish people, are they not?—Yes, they are.

9811. Do they intermarry very much?—I believe there is a good deal of intermarrying.

9812. This might establish a tendency to tuberculous disease, might it not?—Yes, I think it might.

9813. In the examination of the sputum in cases where dust phthisis exists, do not you think the referee would reasonably expect a record of such particles as found in the sputum, which is a kind of post-mortem after all, is it not?—Yes, if you say so.

9814. (Dr. Legge.) In this list of diseases amongst quarrymen does the first sheet represent those cases at your own works?—They have all occurred at our works in the different years.

9815. Do you propose to fill in the ages of the men?—Yes.

9816. You mentioned Dr. Richard Jones as a person in whom you had entire confidence?—Yes.

9817. Has he attended most of these men?—He attends, I think, the larger proportion of them.

9818. Could you ascertain from him the cases in which he thinks there is any effect arising from dust?—Yes, I could ask him to do that.

9819. Because the mere statement without some commentary by a doctor who is acquainted with the conditions under which the men work is not of very great assistance?—No, of course those are the diseases under which their deaths have been registered, and the cer-

tificates have been very largely given by Dr. Jones himself.

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Ashmore.

9820. And therefore he would be able to say in which cases amongst them there was a certain amount or a large amount of dust?—I think he will, if he can.

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Mr. M. KELLOW, called and examined.

9821. (*Chairman.*) Are you general manager and secretary of the Park and Croesor Slate Quarries in North Wales?—Yes; and an Associate Member of the Institution of Civil Engineers and a Fellow of the Royal Geological Society.

9822. Have you been connected with those quarries for 30 years?—I have been connected with the Park Quarry for 30 years, and with the Croesor Quarry for 12 years.

9823. How many men are there employed in those two quarries in all processes?—179.

9824. How many of those are employed in the mills?—57.

9825. Can you tell the Committee what is the death rate from pulmonary diseases among those workmen, or from all diseases of the respiratory system?—If you include asthma, pneumonia, and phthisis, five was the total number during 10 years.

9826. How many of those five were employed in the mills?—None.

9827. With regard to the death rate among quarrymen, for the purpose of these statistics, do you include men who die when they have been very recently in the employ of the quarry, or do you include men who have left a year or two and have then died?—If they have worked elsewhere after leaving our employment I have not included them—that is to say, if they have left our employment and been employed elsewhere after leaving our quarries. But in any case where a man has died who has not worked elsewhere I have included him.

9828. Have you any knowledge of the number of cases of death from these diseases amongst men who have worked in your quarry and have then gone to work elsewhere?—I have not.

9829. Have you any reason to think it would be at all large?—No; on the contrary, I think it would be quite small.

9830. Is it your opinion that men suffer from lung diseases from their employment in the quarries or mills?—Certainly not.

9831. You do not come across many men in the mills who show signs of chest trouble from inhaling dust?—I do not know of a single instance since I have been connected with either of the quarries in which we have had a case of phthisis amongst any men in the mills, fatal or otherwise.

9832. Do the men work on to a considerable age in that employment?—I have particulars of two deaths which I have scheduled, one of a man who worked to within a few months of his death, and that man died at the age of 73, and another man who died at the age of 66.

9833. Are those the only two deaths that you have had in the mills during the last ten years?—Yes.

9834. In the Croesor quarry you have had eight deaths, have you not?—Nine deaths, including the two quarries.

9835. Of those, were there two cases of phthisis, two of pneumonia, and one of asthma?—Yes; those are cases elsewhere than in the mills, which practically means underground.

9836. Did one die of heart disease, one from inflammation of the bowels, and another from a cause unknown?—Yes.

9837. Have you anything to say with regard to the two cases of phthisis?—One of these men had been a farm labourer nearly all his lifetime; he only worked a few weeks in the quarry, and he had contracted phthisis before he became a quarryman.

9838. Is either of your quarries wet, or do they drill in the dry stone?—There is a certain amount of moisture present, but it is exceedingly small.

9839. Do any classes of your workers inhale much dust during their work?—They do not.

9840. Have you any illustration to offer the Committee to show the amount of dust that is evolved?—The work in the mills consists of cross-cutting the rough slate blocks by circular saws, splitting them to the thickness of roofing slates, and dressing them to rectangular forms by rotary knives. The circular saws travel in troughs filled with water and rotate at a slow rate, about 35 to 40 revolutions per minute, and sometimes a water drip is also arranged to fall on the block as it is being cut. These conditions practically preclude the formation of dust. The operation of splitting is not productive of dust. The rotary knives used for dressing travel also at a slow rate, about 30 revolutions per minute, and the pieces cut off are relatively large, mostly several square inches in area. Although some dust results from this operation the quantity is negligibly small. The Croesor mills were painted about two years ago, at which time all the woodwork was cleaned. Since then no dust has been removed. I caused to be carefully collected the dust that had settled during that period on a horizontal area of one square foot.

9841. Was that on the floor?—It was on the horizontal beam of the principal which passes over the saw tables.

9842. About how high would that be from the ground?—About 9 feet to 10 feet.

9843. Would you find the same amount of dust on the floor?—It is very difficult to state what that would be, because it is not a paved floor; it is an earthen or a slate floor.

9844. If you had taken some window ledge or some other place three or four feet from the ground would you have found more dust?—I think it is probable the place I selected would contain the maximum amount to be found in any part of the mill, because it was right above a saw table and dressing machine. This amount was the maximum amount of dust discoverable. Its weight was 18½ drachms. Taking the dust at the density of slate, this represents a thickness of .0009678 of an inch over one square foot of area.

9845. (*Professor Allbutt.*) About what height was that?—About 9 to 10 feet from the floor.

9846. That is a long way above the men's mouths, is it not?—Yes.

9847. It is a heavy dust, is it not?—It is a comparatively heavy dust, but I do not think you would get more than that, even at a lower level.

9848. Not on the window ledges?—No; in fact, we have no window ledges; all the windows are in the roof. I consider that this test bears out the statement that the quantity of dust present in the atmosphere is negligibly small.

9849. (*Chairman.*) Is it your opinion that the men employed in the quarries and mills do not suffer from any disease owing to the occupation in which they are engaged?—Not that I am aware of.

9850. (*Mr. Cunynghame.*) Is the trade that you are doing a good trade? Is it in good condition?—No; on the contrary, it is in a very bad condition.

9851. To what do you attribute the impression that has been created in some quarters that slate dust is injurious. If it is not injurious, it would be curious to know, would it not, how the impression has arisen that it is injurious to the lungs?—I am not aware that that impression generally exists. I am aware that the statement has been made, and was made, in fact, before a committee on which I gave evidence.

9852. Do you date the impression from the time of the Report of that Committee?—That is the only evidence I have of the existence of the impression. We hear absolutely nothing of it amongst the quarrymen themselves.

9853. (*Dr. Legge.*) Can you give an analysis of slate? Can you tell the Committee what it is chemically?—It is a silicate of alumina. I cannot recollect all the constituents at the present time, but there is nearly

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Mr. M. Kellow. 60 per cent. silica and nearly 40 per cent. alumina, and some other ingredients the exact proportions of which I do not recollect, but the constituents are chiefly silica and alumina.

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9854. (*Chairman.*) Is there anything else you wish to add?—I think if any diseases are going to be scheduled in connection with slate quarries it would be very desirable that the onus of proof should rest on those making the claims; otherwise it might result in considerable harm to the men themselves, because it would probably have the effect of our eliminating any men found to be suffering from any of the scheduled diseases.

9855. If the onus of proof were thrown on the men, and you had that safeguard, in addition to a certificate by a certifying surgeon and the medical referee, do not you consider that that difficulty would not arise?—I do not quite agree with that view, because in cases of this kind we are put to a very great deal

of trouble in contesting claims. Very often very unreasonable claims might be brought forward, and the trouble of contesting these things means a great deal of expense.

9856. But if you have had no cases in your mills and hardly any cases in your quarries due to phthisis at all, and if the burden of proof were thrown on the workmen to show that those cases, when they did occur, were due to the employment, the burden upon the industry would be exceedingly small, would it not?—I am not endeavouring to protect the industry from any legitimate claims that may be made upon it, but from claims by people who, perhaps, had contracted phthisis from causes altogether outside their employment. In bringing any claims for that which really had no proper basis as against the employer, I think there should be no necessity on him to disprove those things. I think the onus of proof should rest upon the people who are making the claims.

Mr. CALEB KILNER, called and examined.

Mr. C. Kilner. 9857. (*Chairman.*) Are you a bottle manufacturer at Thornhill, near Leeds?—Yes, and at Conisborough, near Rotherham.

9858. How many men do you employ in your works?—About 300 at the furnaces.

9859. How many of them would be gatherers, and how many blowers, and so on?—A third would be gatherers, a third blowers, and a third bottle makers.

9860. Do you find that many of these men suffer from cataract or other affections of the eyes?—No.

9861. Have you had cases of men ceasing work because they could not see?—We have had one; I only know of one.

9862. Was that recently or long ago?—Recently.

9863. How many years' experience have you of this trade?—Forty years.

9864. (*Professor Allbutt.*) In Kilner's all the time?—Yes; I am the chairman. The business has been established 63 years.

9865. (*Chairman.*) In your opinion, do these occupations in bottle making cause any affections of the eyes?—Not, so far as my experience goes.

9866. We have had some rather striking evidence submitted by the men, showing a very remarkable number of the men suffering from cataract especially, and other affections of the eyes also, who are now receiving superannuation pay, on account of their defective eyesight, from their trade union?—I believe such is the case.

9867. Have you seen those figures?—Yes; in fact, I had an interview with Mr. Greenwood, the secretary, on Saturday, and he showed me some astounding figures; but that is not my experience.

9868. Have you any criticism to make with reference to those figures?—No, I cannot contradict the figures he has; I can only tell you what I know of my own personal experience at our own works.

9869. Of course, if cases hardly ever occur in a given works there would be a very small burden placed upon the employer if he had to pay compensation under the Workmen's Compensation Act?—Yes. According to Mr. Greenwood's figures, some manufacturers in certain localities would have to pay very heavily, while we should get off, according to my experience, very lightly.

9870. Those figures of Mr. Greenwood's show that particular districts suffer more than others?—Yes.

9871. Which districts?—I think the North of England.

9872. Is there any reason for that? Is the process any different there?—Our furnaces are constructed differently to what most people's furnaces are. We have shades in the furnace that keep the glare of the glass from the men's eyes.

9873. That is not so at Sunderland and other places in the North, then?—No.

9874. Is there any difference in the process which would make it impossible for them to adopt your methods?—I do not know.

9875. The kind of bottle made is just the same, is it?—Just the same.

9876. And is the process of manufacture just the same?—The process of manufacture is just the same, but the material used might not be just the same, and the material used might preclude them from using the shades that we use.

9877. What sort of shades are they?—They are fire-clay shades, which are inserted in the furnaces.

9878. So that the full glare of the flame does not strike the men's eyes?—That is so.

9879. Do your men wear goggles?—No, we have not one man who wears goggles.

9880. (*Mr. Cunynghame.*) I suppose you have heard of cataract in the glass trade, though it has not occurred among your own men?—I only heard it from Mr. Greenwood.

9881. Only the other day?—Only the other day.

9882. Not in all the years you have been in the trade?—I did not know before that the glass trade was peculiar to cataract.

9883. Has not it been commonly talked of before?—No. I may say that we had Dr. Snell down at our works about four years ago, and he could not find a sign of cataract.

9884. Did he search for cataract?—Yes.

9885. Why?—I could not tell you that. He came on his own initiative.

9886. (*Chairman.*) Then would you be inclined to say that the reason why your works are free from cataract while cataract is prevalent in other districts, is because you have those fireclay shades inside the furnaces and they have not?—That is my opinion. Do not the Committee think it would be as well if they had some manufacturer from places where cataract is prevalent? I should recommend you to see Mr. Candlish, of Seaham Harbour, and ask him to give evidence.

Mr. H. E. JONES, M.B., C.M., called and examined.

Mr. H. E. Jones, M.B., C.M. 9887. (*Chairman.*) Are you a medical man in practice in Glasgow?—Yes.

9888. Have you had an opportunity of examining a number of men who have been working with a certain kind of satinwood?—Yes.

9889. When?—The first time was in 1898.

9890. Have your examinations continued to the present time?—I saw some last year. I have seen men on three separate occasions.

9891. Is satinwood still being used?—Satinwood is still being used.

9892. Is it a peculiar kind of satinwood which you have had under examination, or the ordinary satinwood which is generally in commercial use?—I have not examined the satinwoods. The piece I produce here is a sample of the kind the men were using when they were troubled with irritation. I have only the report on the satinwood, so far as I have received it

from the men; but there are different varieties of it used, according to the reports which appeared in the "British Medical Journal." There is one coming from the East and another from the West Indies. I published an article myself in the "British Medical Journal" in 1904, and, following that, Dr. Bidie, Surgeon-General at Baltimore, wrote on the 14th January, 1905.

9893. Will you give us the purport of his article?—I will read it if you do not mind. "In the 'British Medical Journal' of June 25th last there was a very interesting paper by Mr. H. E. Jones on acute dermatitis, produced by satinwood irritation. As there are two kinds of satinwood in use in Great Britain it seems desirable to point out which of these is the dangerous variety. They come from different parts of the tropics, and although very much alike in appearance they do not seem to have any botanical affinity. The satinwood with which I am most familiar is derived from the deciduous true chloraxylon swietenia which grows in Southern and Central India and in Ceylon. It has an astringent bark, which is prescribed by native physicians, and yields a yellow gum soluble in water, the mucilage has a peculiar odour, resembling that of fusil oil. The wood is close grained, hard and yellowish brown in colour, and when polished shows a rich satiny lustre. It contains a yellow pigment and a wood oil. It has been used from time immemorial in Southern India for making ploughs, oil mills, and carts, and more recently for cabinet work, coachbuilding, and making naves of gun carriage wheels. In the earlier years of my Indian service I was for a time stationed near the western forests of Mysore, and while there devoted considerable attention to the useful trees, and published in 1862 a small manual of the timber trees of India. While collecting materials for this brochure, much information was got from native carpenters, timber contractors, etc., but not one of these attributed any harmful properties to satinwood. It may also be mentioned that modern works on the timbers and other economic products of India make no allusion to noxious properties existing in satinwood. It can therefore be confidently asserted that the East Indian timber is harmless, and as a matter of fact very little of it was taken to Europe, as the other variety which comes from Porto Rico and San Domingo is more plentiful and cheaper. The botanical source of the latter is not accurately known, but is supposed by some authorities to belong to Ebenaceae, a statement which seems doubtful, as none of the members of that family appear to possess acrid or irritant qualities. In some species the bark of Ebenaceae is astringent, and a few edible fruits, of which the persimmon is an example. Like the East Indian variety, the West Indian timber contains an oil, and it seems probable that this constituent of it is the offending element. Be this as it may, if further experience shows that West Indian satinwood is often hurtful to workmen it would seem desirable to discard it and use the other variety, which is just as good for artistic purposes and harmless to the artificer. (Signed) G. Bidie, M.B., C.I.E., and K.H.S., Surgeon-General." There is another article following that by Dr. Grabham, and he speaks of the other satinwood, which is the very opposite, and points out where satinwood would be harmful. This was an article in the "British Medical Journal" of April 15th, 1905, by Dr. Grabham, M.A., M.B., of Canterbury, written from Kingston, Jamaica. He says, "Shortly after reading Dr. H. E. Jones's article on this subject I happened to mention the facts to a planter living in the western hills of this island, where the satinwood grows abundantly, and he at once informed me that an irritable eruption was well known amongst the labourers handling the wood, also that he had himself suffered from a painful sensation in his hands after turning satinwood in a lathe. Lately, at my request, he has been good enough to send me specimens of the leaves and wood, from which it appears that the satinwood is derived from no less than four species of Fagana."

9894. (Chairman.) How many men had you under observation suffering from this illness altogether?—I should say about a dozen.

9895. How many men would have been working with the wood, do you think, altogether?—I am unable to answer that.

9896. Would it be some hundreds or scores?—Not so many as that; a comparatively small number.

9897. Had they all been working in the shipbuilding

yards at Govan?—Yes; others, I have heard of since, have been working down the Clyde.

9898. What were the symptoms?—The first man who came to me had his face in a state of acute inflammation—it was swollen; his eyes were literally closed, his ears were very much swollen and red, and also his neck. He gave me the appearance of one suffering from erysipelas. His hands and wrists were also very much swollen and red. In a few days this redness gave way to a swelling still further, and a lot of moisture. There were blisters in some parts, and after a considerable period the skin came off altogether.

9899. Did he then recover?—He then recovered, and after remaining from work until he was better.

9900. How long would that be?—He told me he had been suffering five weeks before he saw me—that he had gone back to work on two or three occasions, but he had to knock off soon again. On going back the men were unable to stand the work for so long a time as before; the new skin became much more easily irritated, and they were not able to stand the irritation so well.

9901. Were the symptoms all the same?—Yes.

9902. Did you find any constitutional symptoms, such as affections of the heart?—None whatever.

9903. They were purely superficial, were they?—They were purely superficial.

9904. Have you any doubt in your own mind that the illness was due to the working with this particular wood?—I do not think it could be otherwise, seeing that when they left off the work they got all right, and got bad when they went back to it again.

9905. Were all the parts exposed to the dust attacked?—Yes, such as face, nose, ears, neck, hands and wrists.

9906. Have you come across similar symptoms amongst working men who have been engaged in working with other woods?—No.

9907. (Mr. Cunynghame.) Have you ever attempted to separate the poison in this wood?—No, I have not, but it has been tried by others, and I have several letters from South Kensington upon the matter. I called this morning to see Mr. Holmes, who wrote me on the subject, but he was not there. Mr. Holmes, in writing to me, told me that he was having the crystals examined and he would let me know the result. That was in December, 1905, but since then I have had no report. Having heard nothing further on the subject I thought it was dead, until I received your telegram a few days ago.

9908. You do not know really, then, whether there is a separable poisonous material or not?—I do not know.

9909. And the crystals appear to be confined, apparently, to a flaw in the wood?—No.

9910. Do the crystals go right through the grain?—Yes, but they are very much worse in the flaws.

9911. Are those crystals silica?—I do not know.

9912. It would be rather desirable, would it not, to try them on some animal?—They have been tried already, I think.

9913. Has any extract been separated from this wood and tried on an animal, or tried on some one artificially?—I cannot tell you more than the papers on the subject state.

9914. (Dr. Legge.) Have you ever tried to get inside the shipbuilding yards to see the processes through which the wood is put?—Yes.

9915. Have you been able to do so?—Yes.

9916. Did you find the wood being actually worked at the time of your visit?—No. I have been through the places, but not when they were working on the satinwood.

9917. From the inquiries you made amongst the men, did you learn of cases which occurred amongst those who were not exposed to the action of the dust?—No.

9918. Did you make inquiries on the subject?—Yes, I did.

9919. And you found, did you, that it was limited to those who were exposed to the dust?—Yes.

9920. Did you inquire whether there were any means adopted for the removal of the dust?—The Factory Inspector called on me shortly after my article appeared

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in the paper, and afterwards he went to the place, I believe.

9921. Did you ever hear the result of his inquiry?—He sent me no report, but I understand he said if it continued some appliances for ventilation or dust extraction had better be introduced.

9922. Has there been any mitigation, do you know, since the time you wrote your report? Have you seen as many cases since?—There have been more in other yards.

9923. What is the longest time which you have had to keep a man, suffering from this disease, away from work?—Every time they went back to work on the satinwood it returned, and the man eventually had to give up. Two men went back to the same yard where they had been before and they were unable to work in the joiner's shop at the wood, and latterly they were unable to go into the shop at all, because the dust of the shop seemed to irritate the skin. They were then sent to another and a higher loft and isolated, and have worked with other wood and got on all right.

9924. Is the use of this wood intermittent?—Yes, it is only used for ornamental purposes, and it is only an occasional order in shipbuilding that asks for satinwood.

9925. Have you heard of similar cases treated by other medical men besides yourself?—At the time I saw these cases two or three medical men also saw them, and Dr. Barras, the medical officer of Govan, also saw them. He treated a few of them, while I treated some others. Dr. Campbell also saw one or two cases, and some of the men went from doctor to doctor; they did not confine themselves to any one doctor.

9926. Do I gather that the skin gets so permanently injured that they become more susceptible to the effects on returning to work?—Quite so. I may say that the first man who came to me told me of others, and I saw four of them, whom I sent to see Professor Sir Thomas Anderson, who is a skin specialist, and he said he thought it must be due to something in the wood with which the men were working. He knew nothing about what kind it was, but he said he thought the irritation must be due to the wood. That was in 1898—the first lot of men I saw.

9927. Did you send any of the material to the Imperial Institute?—The material has been sent to several places, but I do not know where it has been sent to. Mr. Whitton, the Superintendent of Parks in Glasgow, got two or three samples of satinwood from me to send to London, and some 28 lbs. of satinwood dust were sent to London.

9928. Experimentally the production of dermatitis is not confirmed, is it?—My explanation of that is that it is a different satinwood. So far as the men were concerned, they required to be at work with the wood for some considerable time before it had any effect.

9929. It was a cumulative effect, was it?—Yes, it came on after a lapse of six or seven weeks. You would need to experiment with a man in the same way.

9930. (Mr. Cunynghame.) I see Mr. James O'Grady, trade organiser, writes in a pamphlet, and says that the wood in question is yellow in colour, and used in place of satinwood, which seems to imply that it is not satinwood, and, secondly, he says that it comes from the Congo, in West Africa. Have you seen that?—I do not know where he gets his information from.

THIRTY-FOURTH DAY.

Tuesday, 26th March 1907.

PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Mr. T. M. LEGGE, M.D.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. D. C. CUMMINGS, called and examined.

Mr. D. C.
Cummings.

26 Mar. 1907.

9931. (*Chairman*.) Are you the General Secretary of the Boilermakers' and Iron and Steel Shipbuilders' Society?—Yes.

9932. Do you attend here to-day to give evidence on behalf of that society?—Yes.

9933. Do you consider that the men following your trade suffer specially from any form of heart trouble?—Yes, but it is principally on account of the heavy work, and working piece-work. Our medical men, who are appointed to every branch throughout the society, are constantly telling us that the heart troubles are on account of the exhaustive work, combined with piece-work.

9934. Which departments of work are the men engaged in who suffer specially from these diseases?—I should say principally the rivetters. Their work is continual, especially in these days, when shipbuilding and boiler work is increasing in weight, and the work is much heavier than it was ten or twenty years ago. It is constantly getting heavier, and although there is a great deal of machine work now introduced, a great portion of the work, especially on the ships, has to be done by hand rivetting. We find with every fresh introduction into the trade, where the work is made heavier, as it were, suddenly—that is to say, a new type of vessel or boiler comes into existence—there is

increasing sickness. That has been our experience over many years.

9935. Are the symptoms shown by your members different from the symptoms shown by other people who exhaust themselves by hard work?—I should say yes, with the exception, perhaps, of blacksmiths who may be working piece-work.

9936. But I suppose it is after a man has been working for a very considerable number of years that he finds his heart affected by the arduousness of his labour?—The medical men tell us, on examination of quite young men—rivetters—that they can tell what occupation they follow.

9937. Do you consider that those diseases ought to be scheduled under the Workmen's Compensation Act?—That is perhaps difficult, unless it could be proved that it was the direct cause.

9938. Supposing they were scheduled, who do you think ought to pay the compensation, seeing that the disease would be of extremely gradual growth over a long period of years, when a man might have been working for half-a-dozen different employers?—That, perhaps, would be rather difficult to say, although the same thing applies to accidents. If a man loses his eye, and he is certified as being able to follow his

employment, if he is employed again, and his other eye gets injured, the latest employer has to pay.

9939. Then the accident clearly happens in the employment of the last employer, does it not?—Yes; but if the man had had two eyes it would not have affected him, probably.

9940. Do you consider that your members suffer from rheumatism more than other people do?—So it is reported to us by the medical men. They say there is a great deal of rheumatism and paralysis and lung and chest complaints as well.

9941. But these are all diseases not peculiar to the trade, are they, as lead poisoning is peculiar to lead workers, or anthrax is peculiar to those who are engaged in handling wool and skins?—No, not in the same sense, but we show a greater proportion than any other trade engaged in engineering or iron shipbuilding.

9942. If you had a particular case of a man suffering from one of these ailments, is it your opinion that it would be possible to say, "This man's disease is due to his employment"?—In some cases, yes, where men in repairing work have to get into boilers which have been lately under steam. Some regulation ought to be applied by which the boiler should be sufficiently cooled down. Say a vessel is ready to go to sea, and there is some leakage discovered in the boiler, although men do not always have to get inside, they have more often to get into the fire boxes; but there are occasions on which it is necessary to get inside the boiler, and, the boiler not being cooled down sufficiently, they work in extreme heat, they come out and get a chill, and there have been cases of death in a very short time, or they have been so much affected as to be unable to work at their trade.

9943. That is through getting a chill by coming from a hot temperature to a cold temperature?—Yes. I think that should be scheduled, or there should be some restriction guarding the men against going into a boiler which was too hot. Certainly, there may be a cargo on board and the ship waiting to go to sea.

9944. But if the men wrapped up warmly when they came out would they not be safeguarded from chill?—That is impossible under working conditions. A man comes out, perhaps, for a few minutes to breathe, because with the heat and steam arising it is sometimes a question of breathing. Perhaps there is a little neglect when a man gets a sudden chill.

9945. Apart from that, do you think it would be difficult to distinguish in these cases of heart trouble, rheumatism, lung or chest complaint whether or not the disease was due to the man's work?—Yes, it would be very difficult to trace.

9946. Do you think it would be impossible to trace in a court of law?—In a few cases it might be so, but not in the majority.

9947. In what cases?—Where it was found that a man was quite healthy at first, and he had been continually at work of this description under some repairing employer. It might be somewhat more difficult with heart complaints, but I think chronic rheumatism might be quite easy to trace. Every man that enters the society has to pass a medical inspection and get a clean bill of health before he starts, and if he is affected he is refused as a benefit member of the society. If within two or three years afterwards it was found that through certain classes of work he had certain complaints, I think it could be easily traced.

9948. With regard to deafness, do your members suffer specially from that?—Yes; that is quite attributed to the trade. Even some of us who have been away from it for some years feel that difficulty; the doctors tell us that it is impossible to cure it. They cannot just decide what is the actual cause. I was in conversation the other day with one of our medical men, who has been connected with the society for over forty years, at Newcastle, and his opinion is that the continual vibration on the drum of the ear caused by the noise thickens it in some way, and they can find no possible cure for it.

9949. The men go on working, do they not?—In most cases a man gets used to the noise, and he seemed to be able to hear in the noise better than when things are quiet.

9950. Have you known cases in your union of men receiving superannuation or sick pay because they are unable to work on account of deafness?—Yes; they come on earlier than in most trades on that account.

Dr. Newton describes it as premature old age. Our men are on the funds much earlier for superannuation, not often certified as suffering from extreme deafness, but more often from paralysis and chronic rheumatism and heart complaints.

9951. Suppose that deafness were scheduled as a subject of compensation, a man would only get compensation if he was prevented from working by his deafness, just as a man would only get compensation if he was unable to work from lead poisoning. Would it be worth while to schedule deafness when the cases are exceedingly few (if, indeed, they occur), in which a man is incapacitated by the deafness alone?—I can quite see the great difficulty in proving it, because they go on working as long as possible. I cannot call to mind a case in which a man has left work in young life. We have men injured through deafness, but that comes under the Compensation Act in another way; that is to say, when something is happening, and they are too deaf to hear a warning cry, that accounts, perhaps, for more accidents amongst our men than amongst men in other trades.

9952. Do they suffer from any peculiar diseases of the eye?—Only blindness, or partial blindness, coming on rather early in life in consequence of the continual entry into the eye of foreign matter. I have lost part of the sight of one eye myself from that; it is impossible to read by it; it went before I was thirty years of age.

9953. Was it in consequence of sparks?—It was through a piece of hot scale. But you are continually getting in our trade foreign matter into the eye, and it is common to find in almost every yard someone with a magnetic knife to extract it. We have an enormous number of eye troubles, but that is, of course, apart from disease.

9954. Do you say through trivial accidents occurring again and again to the eye, each one not sufficient to incapacitate the men, ultimately the eye itself is ruined?—Yes, it gradually injures the sight, and we have men leaving off work and going on to the fund through partial blindness. Under our rules a man can claim a bonus which is supposed to help to give him another start in life. Of course, he cannot claim compensation unless it is an injury right out, and then he claims another bonus—what we call a sick bonus.

9955. Have you any statistics showing the number of cases of men in your trade whose sight is injured in this way, who would not get compensation for accidents?—It is possible to get them; we keep a record of how many bonus cases there are in each year, but I should say out of that number there would not be more than three or four per year.

9956. Three or four a year whose eyesight has been gradually affected?—Yes, in the way I have described.

9957. They are not men who suffered by definite accidents?—The definite accidents come under another list of accident bonuses, they get twice the amount of money as a bonus to help them. There are two bonuses, one of £100 and the other £50.

9958. Then do they recover their sight after being away from work?—Very seldom, in one or two cases they have sufficiently recovered for a man to make another attempt at the trade, but we find it is only a matter of a year or two before he is off work again.

9959. Otherwise what happens to them? Are they able to engage in some other employment, or is their sight too bad to enable them to do anything at all?—Sometimes they may go into other employment, but most of them go into some small business where the wife and family can help them. I know of a few who have gone labouring, but it is very seldom they are employed in that way. They can only get such employment under a sympathetic employer.

9960. Do you find that these cases occur within a few years after a man has entered the trade, or is it always after he has been employed for a considerable period?—I think it is of slow growth, they get well into and past middle age before being affected.

9961. (*Mr. Cunyngame.*) In Dr. Oliver's book entitled "Dangerous Trades," he states, "Boiler makers as a class are not unhealthy. At the present time there are 38,000 members of the Society. In 1889 there died 436 members, a number equal to 9 per 1,000, as against 8 per 1,000 of the male population of the country generally." Would you agree with that general estimate?—Except that it has increased during the

Mr. D. C. Cummings.

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Mr. D. C. Cummings. last six or seven years. The average death-rate for the last five years has been over 10 per 1,000.

26 Mar. 1907. 9962. This was published in 1902?—Yes, but Dr. Oliver did not get the figures from us as lately as that.

9963. Have you the figures showing the later increase—because it must be a considerable increase? Your statement that your members suffer 50 per cent. more than members of other trades in the country rather astonished me, because all the returns and reports we have rather show that it is not an unusually unhealthy trade?—If a boy is going to the shipyard and the boiler shop, and there are two or three sons of a family, the strongest and healthiest son is picked out to go into that trade, if the father makes any selection at all, because of his knowledge that it will require a strong man to do the heavy work.

9964. But you could hardly say, could you, that because the trade requires the strongest boy to be put in it, therefore you are to consider it an unhealthy trade?—No, I do not mean it in that way. I think we therefore ought to have a less amount of sickness. Taking the Amalgamated Society of Engineers, they have about 100,000 members—we have 50,000, roughly speaking—their membership is just about double ours. Our average of members last year on the sick list was 2,100 odd, and theirs about 3,000 out of the 100,000; what applies to about five years' average, and it is from that I get my figure of 50 per cent.

9965. Where can the Committee get these figures?—Each society publishes what we call a monthly report. I have not them with me, but I could send them to the Committee. Looking at the Engineers' figures and also the Associated Shipwrights' figures, our figures come out much higher.

9966. There are many ways in which that might be accounted for; your society might perhaps take a less strict standard for relief, might it not?—Quite so; but against that is the great number of accidents we have, compared with other trades, because of the nature of the work.

9967. But as the Committee have only to deal with diseases, you would have to take out the accidents on both sides, would you not, because a large proportion might be accidents?—That would be rather difficult to get, because, with regard to men on the sick fund, we do not separate the accidents from other cases.

9968. But as we know your accidents are numerous, you fail to prove your case if you do not separate them somehow or other, do you not? The difference may be due, and a large portion we know is due, to the greater number of accidents. Then is it not for you, in order to make out a case for exceptional treatment here, to show that the incapacity is due to disease in part?—I think a lot of it is due to some affection of the heart that requires a man to go off for rest for a few weeks.

9969. We have a very sympathetic and friendly author writing and saying boilermakers are not unhealthy, and giving his reasons, and he is against you apparently, is he not?—I do not want to question anything Dr. Oliver has said.

9970. But your conclusions are very different from Dr. Oliver's, are they not?—Dr. Newton, living in the same town, has been connected with our men for forty years, and is the medical attendant for one of our branches, and he comes to quite a contrary conclusion.

9971. Then if there is an issue between them on the matter, it is one that requires a good deal of investigation, is it not?—Quite so.

9972. I suppose it is conceded, though of course it is a great disadvantage for a man to be deaf, that it does not interfere with his employment. A man is no worse for being deaf, is he? Have you any case in which a man has come on your funds from deafness alone, and no other cause whatever?—No, I do not think there are many cases.

9973. But is there one?—We have had an odd case or two in which a man has been certified as unable to follow his work because of extreme deafness, which makes it impossible almost for him to hear a sound; but that is not a very ordinary case. In ordinary cases we are very nearly all deaf, and it is evident within a year or two of a lad's apprenticeship.

9974. I fail to see that you prove that deafness prevents a boilermaker following his employment. In some respect, in so far as the employment goes, one would

almost rather be a little deaf, would he not, because it prevents one hearing the clang, which I admit is an awful thing?—I do not think there are cases in which I could bring very strong proof. Deafness has an effect in this direction, that it is responsible for some of the accidents.

9975. If a thing like deafness was to be put down as a cause, and a man could get compensation when he became deaf, it might end in a considerable amount of men being eliminated from the trade, might it not, before they were unfit, and so it might tell considerably against the workers, might it not?—Yes, that is a danger which I have seen.

9976. Altogether, do I understand from you that you have rather a doubt in pressing the case of deafness?—Yes; I think it would be very difficult to prove, or that it could be clearly shown that a man was off work in consequence of that.

9977. It would be of doubtful advantage to the men to include it, would it not?—Yes, I am of that opinion myself, because we have found that, even with the accidents to the eye, it is a doubtful advantage to say too much about it.

9978. You have a certain bonus scheme, I understand. Is there a special bonus with regard to the eyes?—No, it affects all accidents; but we have a considerable number of eye accidents. Every man who meets with an accident totally incapacitating him is entitled to £100 from the society.

9979. In your case, a splinter flew into your eye, and you would have had compensation in the ordinary way; but if we were to include gradual deterioration of the eyes from the employment, would not clerks, draughtsmen, and a whole mass have to come in? After all, does not any employment gradually injure the eye, and could you really call it a distinctive trade disease? Is it marked enough? And is it not better, in fact, to leave it as a question of accident in the interests of the men themselves?—Yes, I think it would perhaps be best to leave it in that way.

9980. If some day a disease could be proved more distinctly, it might be a different matter?—What I consider would be a solution of it would be for some special provision to be made for men losing one eye.

9981. That would be an accident, would it not?—Yes, but even then he is certified as fit to follow his employment. In fact, I heard an insurance agent make the remark with regard to a man who had lost one eye completely, that the power of the other eye was one half, and he certified him as fit to follow his employment. In that case the man is under an extreme difficulty in getting employment. He has lost one eye, and has only half power in the other.

9982. Then he would get compensation for the loss of one eye, would he not?—No, only for the weeks he is off work; he would have to be almost totally blind before he could come on for compensation.

9983. (Professor Allbutt.) With regard to "heart diseases" or "eye disease," neither of these are such terms as convey any definite idea to a medical man, do they?—No.

9984. That, of course, is the first difficulty. And your hypothesis of the gradual accumulation of accidents ending in permanent injury to the eye is very speculative, is it not?—Is not it possible if you get particles of iron continually in your eye week by week, even although they are removed in a very little while, and you go on with your work, to bring about a gradual but sure permanent injury to the eye?

9985. Not if the man got well between each accident. You see, "disease of the eye" may mean cataract, which is an internal disease, or, again, it may mean disease of the optic nerve, and so forth?—Quite so.

9986. Can you produce to the Committee reports from medical men, in which the various forms of eye defect are classified?—No, I am afraid they are too short in their reports. They simply say this man is suffering from partial blindness brought on no doubt through working at his trade.

9987. That is merely an opinion, is it not?—Yes.

9988. Saying a man is blind is no more definite than saying a man is weak?—That information could only be obtained by writing to some of our medical men.

9989. The same difficulty applies, does it not, to heart disease? You do go into a little more detailed diagnosis with regard to that, but you cannot tell us,

I suppose, what relation rheumatism bears to the heart disease, can you?—No.

9990. You know, I daresay, as a matter of common knowledge, that heart disease follows rheumatism very frequently?—Yes, very frequently.

9991. So that if you wish to press that form of heart disease you would have to consider the factor of rheumatism, would you not?—Yes, I quite see the connection between the two.

9992. So that heart disease following rheumatism would not be the direct effect of occupation, would it?—No, but there would be some forms of heart disease or affection the direct effect of heavy work, though I quite admit it is difficult to trace.

9993. You would have to call it by some such name as heart strain, would you not?—Yes.

9994. Do you think you can regard ordinary wear and tear as a disease in this connection? There are fifty men, say, engaged in fifty different trades, and, of course, there is wear and tear in all of them; you would not call this disease, quite, would you?—No, it comes perhaps gradually through the trade, but it is difficult to schedule it as a disease.

9995. In any calling?—Yes, I quite understand that. As the Chairman put it, it is impossible to put it in the same class as anthrax.

9996. Putting it broadly, wear and tear is one thing, and a disease due to a particular occupation is another, is it not?—Yes, the only thing, of course, is that on account of the work it is attributable more to our men than to any other men.

9997. It comes on at an undue rate, do you mean?—Yes, it comes on much quicker and earlier, principally, I think, caused through piece work, because it is natural if they were working time work, they would not work nearly so hard. The piece work system is a thing which it is almost impossible to abolish; it is almost a second life to the trade.

9998. I thought rivetting was done by pneumatic and other machinery?—Not much in the shipyards.

9999. Is the rivetting hammer a heavy hammer?—Not very heavy, but to-day rivetting up under the bottom of a vessel in awkward positions is heavy work; the rivets must all be knocked up from underneath, and there are thousands of men doing hand rivetting in the country.

10000. Do you consider it harder labour than a man wielding a 12 or 14 lb. hammer?—Yes, it is heavier work than a smith's striker, because in wielding a heavy hammer you get a swing with it. With the rivetting hammer it is all done from the shoulder, and then it is all so rapid. Riveters work in twos, and the rivets must be knocked down as quickly as possible while they are hot. The men work at enormous speed, and the motion is quite different and more exhausting than the motion of wielding a sledge hammer.

10001. Do you think the rapid work in a very awkward position would have the same or a similar kind of strain upon a man's heart and organs as the more leisurely swinging of a big hammer?—I think so, and more. If you take the heavy Scotch boiler (which is now giving place to the water tube boilers), which followed a much lighter boiler, different in shape, when they were first introduced steel rivets an inch and a quarter, and sometimes an inch and a half in diameter, were used, and worked by hand; and it was noticeable on the big battleships that the contractors' men who were doing work on the boilers came on the sick list in far greater numbers than they hitherto had done, until matters steadied themselves somewhat as the men got worked into it. They used to have to leave work for a week or two for a rest, and the cases were certified as trouble of the heart.

10002. A very large number of them had disturbance of the heart?—Yes, it was certified by the medical men for putting them on the sick fund, that they had some disturbance of the heart.

10003. Have you in your society men whose labour is heavy in the common sense of violent exertion?—Yes, that applies to most men on certain jobs. If you take the platers at the furnaces; in bending the hot plates for the stem and stern of the vessels, when the plates are moved out of the furnaces, there is violent exercise, but then they are assisted by men who swing the heavy hammers, and they do not feel the strain that the rivetter does, because there is a rest occasionally, whereas the rivetter is continually at it. I have seen

the difficulty in proving all these things sufficiently well to enable the Committee to schedule it in the manner you would schedule other diseases.

10004. With regard to the heat of the boilers in which the men work, have you any notion of what the heat is inside the boilers? Do you mean that it is 104 or 120 degrees?—Yes, often as hot as that. When boilers are under steam it is impossible to cool them rapidly.

10005. How long might a man have to work in a temperature of 120 degrees?—It very seldom occurs, and it is only in cases of extreme necessity. Then the man is not in many moments, and has to come out for a breather. Mostly the repairs are in the furnaces, and though it is exceedingly hot in there, he gets bags to lie upon, and there is a current of air coming in from the furnace mouth. That does not affect him much. It has to be done at sea, for instance, if anything goes wrong, but the dangerous cases have been when men have had to get inside the boiler itself.

10006. Do you think such cases are so rare that we need not make any special provision for them?—I think in a case of that description, where a man could prove he had been compelled to enter a boiler, and had got a chill, we ought to be able to claim compensation for him under the Act.

10007. Unless proper means had been taken to make it safe. It is easily preventable, is it not?—Yes, by a little more delay, and that is why I think something should be done in that direction.

10008. (*Dr. Legge.*) Do you know the comparative mortality figures of persons engaged in different industries published by Dr. Tatham, the Superintendent of Statistics?—No, I only know that the general death rate of people over twenty is about eight per thousand.

10009-10. I suppose you have been struck by the frequency of rheumatism in the certificates?—Yes.

10011. But is not it the case that you find the same thing in all sick clubs?—I only know that the doctors tell us that our returns are greater. In conversation with medical men in different parts of the country, they have said that it is due to exposure in the ship yards and working in all weathers, the work being heavy work at the same time.

10012. It is very difficult to see from these figures how a strong case could be made out for treating boiler-makers differently from others, even as regards diseases of the respiratory system or heart affections, is it not?—You see, Dr. Oliver gives our increased death rate amongst persons over twenty as higher than the average death rate of the country.

10013. It is not as high as that of occupied males in London, for instance, the comparative figure for which is 1,147?—That may be so. On the other hand, although there is this trouble that comes on us through the trade, we do have the benefit of working in the fresh air on the sea and alongside the big rivers where the air is purer.

10014. One often hears it said, perhaps by people who do not know much about it, that people working as you have described these men work will not wear eye protectors, which can be worn. Can you say anything as to that?—That is true; but the difficulty is to get an eye protector which is adequate. A man puts on a protector simply with gauze on it, and a doctor in Greenock has a very good one. He attends our men there. But it obscures the vision, and where a man cannot see quite so easily to do his work, especially if he is in a dark place, where he frequently is, in the bottom of a vessel, he will not wear it. My experience is, if you get glasses they are more liable to cause injury, especially with riveters working together with the two hammers. Caulkers and others can wear them with ease, but where two riveters work together, the hammers, by a misblow, might come together, and throw off dangerous splinters, which might break the glass and injure the eyes. Then, again, if there is glass in them, with a gauze covering over it, they get very damp and wet, because the men get very warm at their work.

10015. Does your society encourage the use of eye protectors?—Yes, we do. In one or two cases, where we have found what we thought an excellent eye-guard invented, we have advertised it quite freely in our monthly report, and called our members' attention to it, especially the one I mentioned invented by the doctor at Greenock two or three years ago.

Mr. D. C. Cummings.

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MR. J. DICKINSON LEIGH, M.D., F.R.C.S., L.R.C.P., D.P.H., called and examined.

Mr. J. D.
Leigh,
M.D.,
F.R.C.S.,
L.R.C.P.,
D.P.H.

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10016. (*Chairman.*) Are you a medical man now in practice?—Yes. I was formerly one of the medical referees under the Home Department. I am now practising at Bishop Auckland, in the county of Durham, and Mr. Wilson asked me to advise his Association on the cases to be brought before you to be scheduled, and we ask you to consider the question of beat hand, miner's elbow, miner's knee, traumatic pneumonia, and nystagmus.

10017. Do you think there is any prevalence of fibrosis of the lung among miners?—I have had no experience of it.

10018. Have you ever come across a case of what is called anthracosis?—No. Of course, from post-mortem examinations I make, among them I find the typical miners' lung, the blackened lung, but I have not found any fibrosis.

10019. Never?—I may have found an odd case, but it has made no impression on my mind. In the post-mortems I have made, the question has been whether the case has been due to accident or disease, and I have had quite a number every year for the Miners' Association.

10020. Do you come across any considerable number of cases of sprained wrist or strained wrist due, not to accident, but to continually working with a pick or a drill?—Yes. I have found a good deal of it amongst people working in the ship yards and the men who have worked in the engine shops, and I have seen it amongst miners using the pick.

10021. (*Professor Allbutt.*) That is a bursitis, I suppose?—It is really a synovitis.

10022. The Chairman intended to indicate a relaxation or displacement of the small bones?—I have not seen that. I have seen something which results in a fluid in the tendons, and it usually lasts a week or ten days, but we find by blistering or painting with iodine and pressure you get rid of it.

10023. Do you see men going about wearing straps on the wrists?—Yes.

10024. Does that suggest to you that the fascia may have got relaxed?—Yes.

10025. But still they do not complain to you much of it?—Yes, they do complain.

10026. (*Chairman.*) Do you ever come across cases of men incapacitated from working by that?—Yes. I have seen that, too; but I have found it to occur more commonly among the Cleveland ironstone men, who used to complain a great deal of it.

10027. Of the strained wrist?—Of what they called a strained wrist, but I never found any displacement of the bone, or anything of that kind.

10028. Was there any overt symptom, or was it entirely subjective?—You could detect it if you put your hand on it and asked the man to move his fingers; you could distinctly feel creaking, and then there was a distinct swelling either on the back or the front of the hand.

10029. Is that due to their employment, do you think?—Undoubtedly.

10030. And it prevents them from working, does it?—Quite.

10031. For how long a time?—A week to ten days.

10032. Not longer?—It depends a good deal on the way it is treated. If a man comes at an early stage, and you get him to knock off work, and treat it by blistering, he soon gets better, but if the man still persists in working it becomes chronic.

10033. (*Professor Allbutt.*) Where do you think it is situated?—In the sheaths of the tendons.

10034. (*Chairman.*) A man may go on working for some years, I suppose, with no symptoms, and then develop it?—Quite so.

10035. (*Professor Allbutt.*) How do the ironstone men injure their wrists?—In the ironstone work they drill holes with a long thing they call a jumper. By pushing at the rock face they get a hole, into which they put the powder, and while they are at work they get at the same time a jar and a twist.

10036. (*Dr. Legge.*) Then there must be the ordinary signs of inflammation in connection with this sprained wrist, I suppose?—Yes. It is a thing that you cannot mistake; I mean it is a thing a man cannot assume he has got. It is an objective thing distinctly.

10037. (*Chairman.*) It does not occur from accident; you think he has not jarred his wrist?—No, you cannot put your finger on a particular day and say the accident happened on that day.

10038. With regard to pneumonia, do you consider that is in any sense a disease consequent on the employment?—My attention has been drawn to the subject as the result of injury. I am speaking of a contusion pneumonia, pneumonia due to a definite accident. I am not speaking of pneumonia from impure air, or anything of that kind.

10039. That would hardly come within the purview of this Committee, any more than blood poisoning following a wound?—Our difficulty hitherto has been that a man has a definite accident, say, tumbles across a baulk of timber, and there is no extraordinary contusion, but he dies, and when we make a post-mortem we find no fracture of rib, but distinct pneumonia, and our difficulty has been to have that included as an accident.

10040. It could not be scheduled as a disease if the claim is that it is due to accident, could it?—You are considering the question of pneumonia arising from irritating particles, I presume, and as to that I have no experience.

10041. In beat hand, is there always suppuration?—No; there are two varieties—the suppurative and the non-suppurative—and, of course, the question of suppuration or otherwise affects the duration of the disease.

10042. What is the technical name for beat hand?—It is really an inflammation of the palmar fascia.

10043. Have you found it amongst persons who are not miners?—Yes. Do you mean coal miners or ironstone miners?

10044. I include them all?—I have seen it amongst men working in engine works, amongst men who hold the chisels, gripping them as well as striking them, but otherwise I have not seen it apart from coal and ironstone miners, and drill workers.

10045. Is miners' elbow frequent?—That is a bursitis really, and is not an exceptional thing, just the same thing as housemaid's knee. A housemaid's knee and a miner's knee are practically the same thing.

10046. What do you say as to nystagmus?—That is a very difficult point to speak about, but no doubt it is influenced very much by the height of the seam in which the men work. If they are working in a small thin seam you get it more frequently, but when working in the ironstone mines, 12 ft. high, you do not see it.

10047. Do you trace any connection between nystagmus and safety lamps? We have had strong evidence to the effect that nystagmus is due to insufficiency of light, and that it is not found in non-fiery mines, where candles are used?—Quite so; and in addition to the light, there is no doubt the constrained position in which a man works has to be taken into account.

10048. Do you find men can go back to their employment after a period of rest for the eyes?—Yes; but it is reproduced if they go to work; it comes back again. My experience is that you have to take a man practically off the work if you want to cure him. You have to change his occupation, and never let him go back to the mine again. If I had to treat a man, I should advise him to go on to the surface to work.

10049. (*Professor Allbutt.*) Is the nystagmus itself, apart from general symptoms, incapacitating—that is to say, the mere oscillation of the eye?—To a certain extent, yes.

10050. How far would you go in the direction of certain evidence we have had that the degree of nystagmus and incapacity do not advance *pari passu*; that you may have very slight nystagmus, and yet genuine subjective symptoms, or that another man may have very considerable oscillation and be scarcely aware that he has it?—I should think that is quite possible.

10051. That being so, it is exceedingly difficult to get a standard of incapacity, is it not?—Yes, it is, and I do not see how you can meet that point.

10052. (*Chairman.*) Do you come across cases of men who suffer from poisoning by gas?—Yes.

10053. Are those cases of sudden poisoning happening at a given moment, or are they cases in which a man gets gradually debilitated?—Do you mean by a sudden falling down and becoming unconscious?

10054. No, an escape of gas at a particular moment; or does it come from working for a prolonged period in the impure atmosphere?—In the ironstone mines the men become somewhat suddenly gassed from the sulphuretted hydrogen. In coal mining gassing is the result of imperfect ventilation. They fire a charge or there is an escape of gas from the strata, and the ventilation arrangements are somewhat faulty, then you get it; but it does not come on suddenly. A man may continue to work for an hour or two hours before he has to come out.

10055. Then is he ever incapacitated for a week or more?—Yes, I have known a man incapacitated for two months as the result of gassing.

10056. Did he claim for compensation as an accident?—Yes, but we could not prove it as an accident.

10057. Even though it happened at a given moment?—Even though it happened at a given moment. There was one case where we made a post-mortem on a man, and found he died from cerebral hæmorrhage. The man who was working with him was also gassed, and he is off work now. That is three months ago, but we could not take the case into the County Court and fight it, because we could not prove it was an accident. What we could prove was that the brattice cloth, which directed the air along this working, was faulty; but we could not prove an accident. As to that particular case Alderman House will be able to give the details.

10058. What particular gas was that?—A mixture of CO and CO₂.

10059. Have you had many cases of that kind in your experience?—No, I have not had very many. You see, I am not doing contract practice at present. I am doing general practice and some consulting work in the way of operative surgery, and these cases, except the post-mortem cases, and the ones I have just mentioned to you, do not come my way now.

10060. (*Professor Allbutt.*) I suppose you would say where a case results in cerebral hæmorrhage it is an accelerated death upon a previous condition of arterial degeneration?—Quite so.

10061. With regard to beat hand, if non-suppurative would it last longer than a week?—Yes, and I have known it last from three to six weeks.

10062. If suppurative, is it always curable by proper means?—Yes.

10063. It does not end in what is called Dupuytren's contraction?—No, I have not seen that result.

10064. (*Dr. Legge.*) Will you describe the symptoms the other man is suffering from who you say was gassed?—At present he is suffering mentally. He became extremely depressed, lost his memory; he suffered a great deal from insomnia, and he has now got into a condition of melancholia.

10065. Do you recognise chronic poisoning by carbon monoxide gas?—Yes, I think you may have a chronic form of poisoning, but I do not think you would get it in coal mining. The men come out, you see.

10066. You do not attribute this particular case you are referring to to chronic carbon monoxide poisoning?—No, I think he was gassed at the same time as the other man, and he has never recovered from it.

10067. But he is suffering from the chronic effects, is he not?—Do you mean he has been chronically poisoned, or that he is in a chronic condition from the first poisoning?

10068. The latter?—Then, I quite agree. What I mean is that I have no experience in coal miners of chronic poisoning by the escape of carbon monoxide, as you find it amongst metal workers, where you get a form of chronic poisoning from small quantities of CO.

10069. Would it meet your point if the Committee were to schedule carbon monoxide and its sequelæ?—Yes.

10070. (*Chairman.*) Do you find many cases of asthma amongst miners?—That we put down to emphysema.

10071. Do you think it is in any sense an occupational disease, or is it much the same as the rest of the working class suffer from?—I think it is much the same, but we do find enlargement of the heart.

10072. What is that due to?—I think it is due to working in a strained position. I have been struck with the fact in most of the post-mortems I have made that there has been enlargement of the heart.

10073. Do you find many cases in which that incapacitates men from working?—No, it does not incapacitate them.

10074. Then, it could not be the subject of compensation?—No.

10075. (*Professor Allbutt.*) The constrained position signifies more muscular work, I suppose?—Yes.

10076. And these men are very muscular, I suppose?—Yes.

10077. (*Chairman.*) Have you any other point you wish to lay before the Committee?—No, I think that is all.

Mr. J. D.
Leigh,
M.D.,
F.R.C.S.,
L.R.C.P.,
D.P.H.

26 Mar. 1907.

Mr. J. Wilson, M.P., and Alderman House, called and examined.

10078. (*Chairman.*) Do you represent the Durham Miners' Association?—(*Mr. Wilson.*) Yes.

10079. Do you desire to bring to the notice of the Committee the same points as those on which we have just heard evidence from Dr. Dickinson Leigh?—Yes.

10080. With regard to beat hand, miner's knee, and miner's elbow, the Committee have had so very much evidence already from medical men and others that I think it is hardly necessary for us to trouble you on those points?—We have always thought that beat hand and housemaid's knee and elbow should have been treated as accidents, because they arise purely and specifically from the miners' employment, but we have never been able to sustain a case unless we could prove a scratch or something of the kind that initiated it.

10081. But does not beat hand come on gradually in the course of a week or two?—But you can tell immediately if it has been initiated by the work, and it would be still as much an outcome of a man's employment as any other accident.

10082. Have one or two cases been taken into court in an endeavour to secure compensation as accident, and the courts have held them not to be accident?—Yes.

10083. Do you have many cases of nystagmus in Durham?—It is not so prevalent as it used to be since a better class of lamp has been introduced, but there is a thing which induces it more, and that is the thin seams. Nystagmus arises from the obliquity of a man's sight when he is working in the thin seams, as compared with the seams four or five feet thick, where a man sits on a little stool and looks down at his work, whereas in the thin seams he has to lie on his side, when his vision is rather oblique, which gives him a twist in his sight, so that I am afraid the thin seam is the cause of a large number of cases of that kind.

10084. Do you think it is impossible to tell when a man is incapacitated from nystagmus?—That, in my opinion, would be a rather difficult thing to do, because it is a thing that is very gradual.

10085. Do you think the fact that a man only gets half wages when he is receiving compensation and full wages when he is at work, would deter him claiming compensation for nystagmus unless he was really incapacitated?—You have to deal with human nature as it is, but I am one of those who have a great faith in the *bona fides* of workmen. I am ready to admit that there is malingering, and there would be malingering,

Mr. J.
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and Alderman
House.

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and the fact of a man getting half wages might be an inducement with some; but I do not think, speaking generally, that men would take half wages if they could work, because their wants and their families' wants depend on more than half wages. I am making all the allowance I can for human nature, and I believe that men, taken in the bulk, would work if they could do so.

10086. Do you think that nystagmus ought to be scheduled under the Workmen's Compensation Act?—Yes, if it could be. I recognise the difficulty of locating it, and tracing it to its source, or when it starts; but, without going into it technically, which I cannot do, I think a man ought to be compensated just as much for that as he ought to be for an accident. It is a thing which arises purely out of his employment.

10087. Do you think that the risk of occasional malingering ought not to prevent its being scheduled?—No; you will have malingering with accidents.

10088. (*Professor Allbutt.*) The difficulty seems to be in translating the nystagmus into incapacity, does it not?—Yes.

10089. Do you agree that many men may have very considerable nystagmus and not bother their heads much about it?—Yes.

10090. But another man who has it in a very much less degree may be genuinely suffering a great deal. Can you suggest any way of discriminating between those two?—No; it would depend upon the *bona fides* of a man. The common name in the North which we had for it was glimmering. A man walked with his head up, and in that position he was very apt to injure himself in going into his work.

10091. (*Chairman.*) With regard to gas poisoning, do you come across cases of men being gassed, due to working in an impure atmosphere and not due to accident?—Yes; but I would like to say, with regard to the North country (Durham) mines, that they are very well ventilated, and the cases you mention are very rare. I do not think any of the workmen in the North would have any complaint to make as to the ventilation, but there are times when it is outside the power of the managers to do it. Say a man went to work this morning and we could prove that he was affected by gas and bad air on that day, then it has been classified as an accident; but supposing it is the outcome of two or three days, it has not been so classified.

10092. Have you ever come across such cases?—Yes. Dr. Leigh made a post-mortem examination on a man who died through it, and it was shown that he had been working in the place more days than one, and that took it out of the category of accident.

10093. You think if it could be proved that his death was due to the gassing it ought to be regarded as due to his employment and compensation paid?—Yes.

10094. Have you cases of men prevented from working through sprained or strained wrist?—Yes.

10095. Is that due to a sudden jarring of the wrist; is it accidental, or does it come gradually by working with a weak wrist, as beat-hand comes on gradually?—You might have a strained wrist in the case of a man who has been off work for some weeks, and the muscles of his arm have lost their working set, as I would call it. If you were in the north you might notice miners with worsted tied round their fingers and wrists to allay the pain of the sprain when they take hold of the pick-shafts.

10096. Are men prevented from working by it?—They struggle on in pain.

10097. And then they get better, do they?—Then they get better.

10098. You have not mentioned it in your proof, nor did Dr. Leigh, so I assume your society do not attach great importance to that?—We have always been paid for sprains in Durham. If we could prove a sprain of any kind whatever, the owners have admitted the claim and paid.

10099. On the ground that it is due to a definite accident?—It is a benevolence we have benefited by. There is a thing miners have to work with called a jumper, which jars the wrist; and if we could prove that a man has jarred his wrist or in any way strained himself our owners have honourably paid the money.

10100. Does that custom prevail in other parts of England?—I cannot say. (*Mr. House.*) The men are

usually in a position to prove that they have had a sort of a jerk.

10101-2. (*Professor Allbutt.*) Is this jumper used in the ironstone mines?—(*Mr. Wilson.*) Yes, and in the coalmines, too; where they have not machine drilling for shots they use the jumpers. They are things five or six feet long, with a big ball at the end.

10103. And they are used also in the coalmines, are they?—Yes, except where they have drilling machines.

10104. (*Dr. Legge.*) In the cases where you have got compensation for sprained wrist have you been able to satisfy the court that there has been inflammation?—We never take them into court; we have a committee.

10105. You have been able to satisfy the committee, have you, there have been signs of swelling?—We have produced a doctor's certificate saying that a man's wrist has been sprained from some jar or miss-stroke.

10106. Would you be content, supposing one thought of scheduling it, to limit it to sprains of which the doctor could definitely say that there were or had been definite signs of inflammation in the wrist?—Care would have to be had to the use of the word sprain, because it might apply to other parts of a man's body than his wrist. For instance, he might sprain his side in lifting a stone, and if you were to qualify the sprain by the swelling you might cut out that class of case, which has, up to now, been paid for.

10107. Would you like to see sprained or strained wrist scheduled without any condition as to obvious physical signs?—Yes, if it could be proved.

10108. (*Chairman.*) I understand you do not specially mind whether it is scheduled or not?—No, not so far as we are at present concerned, because we are paid for them. In any case, where a man says, and produces a doctor's certificate to say, that he has sprained his wrist or any part of his body, if the manager refuses to pay it comes before the committee.

10109. Do you think there are many cases where men have sprained their wrists in this way by continuous work?—Yes.

10110. Which really are not accidents?—Yes, it is not an accident as would be defined by a law court; but if you take a man who has been working in a soft strata and by our process in the North he gets to the harder coal, the hardness of the jar will affect his wrists and sprain them. It does not last for any considerable length of time.

10111. How long would it last?—I should think never above three or four weeks. Under the new Act, of course, they will be paid for earlier, because of the provision as to the week.

10112. (*To Mr. House.*) You have heard Mr. Wilson's evidence, Mr. House. Have you anything which you desire to add to it, or do you agree with all he has said?—I agree entirely with all he has said, and I do not see that there is anything I can add, except that to define in the schedule sprained wrist would mean that other sprains would not be paid for.

10113. Do you ever have sprains of other parts of the body that are not due to accident?—It is due to accident in lifting a stone, for instance.

10114. But apparently a sprain or strain of the wrist arises from a continuous series of jars, and does not happen at a given moment; but a sprain of the side is a sudden occurrence, happening at a particular moment of time, is it not?—(*Mr. Wilson.*) Yes.

10115. Therefore it is an accident?—Yes. As Mr. House suggests, if a man makes a stroke of the pick and misses, and it swings him round, it might strain him; and I have known of a man straining his knee in that way.

10116. Those would be accidents, whereas wrist sprains would not be?—If you scheduled strained wrist or sprained wrist, would not the fact of that being defined exclude all other kinds of sprains.

10117. No, they would be accidents?—Then that would meet the point.

10118. Have you known many cases of what used to be called miner's phthisis, which is fibrosis of the lung, really due to the inhalation of coal dust?—We have had men troubled with that class of disease, but that would be rather outside our technical knowledge. It is a medical matter. But we see men who are

asthmatic, and troubled with their breathing organs, which arises from the coal dust, we think. I have many a time wondered as a miner how it was that more men breathing and inhaling the small dust were not affected, and I have heard some say that it was a very healthy thing. That kind of thing, of course, may arise from a man getting a sudden cold or chill, to which a miner is liable. For instance, he is working hard, and perspiring freely, and the putter does not come in in time, and the miner then sits down, and as he is always in a draught, he might get a chill.

10119. But that could hardly be proved, could it, to arise from his employment? If taken into court it might be said his disease might just as easily have arisen from his sitting in a draught in his own house, I suppose?—Every bit, but he is not sweating so much. The men's hours are so short, and they work with great intensity, and perspire very freely. When they get their coals loose, and there is nothing else to work at, they sit. The miner has to wait for the putter to take his material away, and he sits there without a shirt on sometimes, and gets a sudden chill.

Mr. J. Wilson, M.P.
and Alderman House.
26 Mar. 1907.

Mr. J. G. McWILLIE, M.B., C.M., D.P.H., called and examined.

10120. (Chairman.) Are you in practice at the present time in Hull?—I am.

10121. Have you had experience of men who are working on ships among the grain cargoes?—Yes, I have.

10122. Do you consider that they suffer from any ailments owing to their employment?—The only one I would suggest being added to the list is ordinary bronchitis, caused probably by the dust being inhaled.

10123. Could you say with any certainty in any individual case that a man's bronchitis was due to his employment?—I have had several cases that are probably due to his employment, but the difficulty is to prove that the dust is the direct cause.

10124. Do you notice any distinctive symptoms in those cases of bronchitis to differentiate them from bronchitis in other people?—The only difference is that the dust particles are found in the expectoration.

10125. Is that the only difference?—Yes; the symptoms are practically identical with those of a case of ordinary bronchitis.

10126. Do you find any other ailments from which the men suffer through working in phosphate cargoes or ore cargoes?—I have only had one ore ship to attend. They come very seldom to Hull, and I have practically no experience with regard to it.

10127. Or phosphates?—No, very seldom.

10128. And grain cargoes only produce bronchitis, you think?—That is my experience.

10129. You have not come across any cases of phthisis?—Not directly caused by dusty grain.

10130. Have you come across any cases of itch?—I had one case that I thought had been caused by the man working amongst the grain.

10131. How long have you been at Hull?—Six years.

10132. Does your practice lie a good deal amongst the dock workers?—Yes.

10133. So that if this was at all prevalent amongst them you would hear of it?—All my patients are private patients, and I do not come in contact much with the commoner dock labourer. I deal more with the better class of dockers, and I have had only one case of itch that I could attribute to discharging grain cargo.

10134. How do you think that arose; what is the cause of it, do you think?—Probably from the dust from the barley.

10135. Organic dust, or inorganic dust?—Inorganic dust, I should say.

10136. Was the man incapacitated from working?—Only about four days.

10137. (Professor Allbutt.) By itch, are you speaking technically or of an ordinary skin eruption?—It is the ordinary scabies.

10138. How could that arise from handling grain?—I think it was probably brought on by the irritation.

10139. Do you assume that the itch insect is to be found in the grain?—I think the dust caused the irritation between the webs of the fingers and then the itch-mite lodged there afterwards.

10140. As regards bronchitis, might not you have two kinds—an acute attack brought on by exposure to overwhelming dust and perhaps brought on time after time and so becoming chronic?—Yes, that is so.

10141. Is that the kind to which you are referring?—Yes, that is so.

10142. Do you find that the conditions of the men's

employment are such that the bronchitis does become chronic; it is not just a single attack?—No, one attack predisposes to a second attack.

10143. It does not end in what you call fibroid phthisis?—No; I have had no experience of phthisis among men working amongst grain cargoes at all.

10144. In speaking of phthisis, do you include fibroid and tuberculous phthisis?—Yes.

10145. Is it accompanied with emphysema?—Very often with dilatation of the heart; sometimes with emphysema, but not much.

10146. And dilatation of the bronchial tubes?—Yes.

10147. Do you consider that it is so frequent in comparison with cases amongst other working men you attend, that it is characteristic of the employment?—It is.

10148. Can you give us any figures at all?—I have had about 20 or 30 cases of bronchitis which I have attributed to the work.

10149. Is that far above the number you would think should prevail in non-dusty employments?—Yes.

10150. Is the grain dust a silicious dust?—Yes, I should think it is.

10151. It is inorganic, at any rate?—Yes, it is.

10152. It is dirt?—Yes, it is.

10153. Is there no obvious way of preventing the bronchitis?—The only way I suggest would be for the men to wear respirators. They do very often wear a black cloth over their face.

10154. Does that in your opinion interfere with their activity?—No, I do not think so.

10155. And you see no reason as a medical man why they should not wear some kind of muzzle?—I do not see any reason. In a very dusty cargo I should think 80 or 90 per cent. of them wear them at present; they are not any specially-designed respirator, but a closely-woven muslin handkerchief tied round the mouth and nose.

10156. Does a man who has begun to wear a thing of that kind discard it, or go on with it?—He goes on wearing it.

10157. He is the more careful kind of workman, I suppose?—Yes.

10158. In your opinion does that go a long way towards preventing bronchitis?—Yes, it does.

10159. (Dr. Legge.) Are the men permanently employed in this dusty work?—They generally get engaged during the discharge of each ship.

10160. Day after day?—Yes, day after day while the ship is being discharged; but they are not what you would call regular workmen. One man would be engaged in discharging a certain ship, and then he might be without employment until another ship with a similar cargo came along.

10161. Have you been able to form any idea as to how long they can work upon this particular work before the chronic bronchitis develops?—Some of them for years, I should say, without showing it at all. It is only in occasional cases that it is found.

10162. Amongst the 20 or 30 men you say you have treated, have there been any permanently incapacitated or who have died because of it?—I have had no deaths, but I have had several cases of recurring attacks. One patient and his son have both had it three times, and the father has had very distinct acute attacks the last three winters, incapacitating him from work about a fortnight each time.

Mr. J. G. McWILLIE,
M.B., C.M.,
D.P.H.

THIRTY-FIFTH DAY.

Monday, 15th April 1907.

PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. GEORGE ALEXANDER, called and examined.

Mr. G. Alexander. 10163. (*Chairman*.) Are you a bottle manufacturer?
 15 April 1907 —Yes.
 10164. Are your works at Leeds and Blaydon-on-Tyne?—Yes, and at Southwick, Sunderland.

10165. The Committee have had some evidence to the effect that glass bottle workers, particularly the finishers, suffer to an inordinate degree from cataract and other diseases of the eye. What do you say as to that?—The finishers sit nearer to the furnace than the others do.

10166. Is it your experience that many of your work-people engaged in those processes have suffered from those ailments?—No, it is rather the contrary. I have certain figures here of the number of men we have in our employ, the number of years they have been in our employ, and the cases of cataract arising from the nature of their work, and the percentage is almost nil.

10167. Will you give the figures to the Committee?—To put it briefly, at our three works we have 250 men actually employed in the process of making bottles—that is, either finishing, blowing, or gathering. That is irrespective of apprentices, boys, and outwork hands. There are three journeymen employed in the process of making bottles, and to each of the three there are six or seven other people attached who are not absolutely considered glass bottle makers because they do not come into contact with the furnaces. From careful statistics we have taken from each of the works, we find that they suffer from no disease peculiar to the trade, nor are they incapacitated from work from any cause derived from the nature of their work; they also appear to be able to continue their work to a good age. Our manager at Blaydon, who has been 25 years in our service, gives the following details:—The maximum age of the men at present in our employ is: Finishers, 60 years of age; blowers, 62; gatherers, 57; the average being 42, 38, and 34 years respectively. Not one of the above wear glasses at their work, nine of them do so for reading purposes, their ages being 62, 59, 57, 57, 56, 54, 53, 52, and 47 respectively. There are 80 men at those works, and, with the exception of two of them, the whole of the above were apprenticed at our works, have worked there all their lives at the trade, a number of them starting as early as 8, 9, 10, and 11 years of age. That was before we were not allowed to employ them under the age of 14. You see that evidence is rather strong, because there is not a single case where they wear glasses at their work, although they have been at the work from their early boyhood up to the age of 60. Our manager adds that during the whole of his experience he does not know of a single case where a man has left work through cataract. Our under-manager, who has had 43 years' experience, corroborated this, and has only known of six men who have suffered from cataract. This man has not been with us for 43 years; he is a glassworker himself, and has worked his way up to under-manager. He says he knows of six cases, but in no single case could the disease be traced to the nature of the employment. Of course that is only his opinion. Then our manager at Southwick, Sunderland, who has been with us 22 years, states that out of 80 men the average age of retirement has been 56 and 60 years of age. He adds that during this time he can only trace four cases of

cataract, all such cases having been treated at the Sunderland and North Durham Eye Infirmary. We subscribe to that infirmary, and the men are treated on somewhat special terms.

10168. Do you subscribe to other hospitals there?—Yes; to all the infirmaries we do.

10169. Why do you specially subscribe to the Eye Hospital?—All the large works support all the different infirmaries. There are only two. There is practically the infirmary and the Sunderland and North Durham Eye Infirmary.

10170. With regard to ailments other than cataract, have you had any experience?—Yes.

10171. Have you any statistics with regard to them?—No. I have a general remark that one manager as to consumption expresses the opinion that there is no trade more free from that disease. I personally have been at the works for 18 years, and have always found that, if anything, the process of blowing is rather more conducive to good health as regards the lungs and tends to strengthen them than otherwise. I know of a man we had called Hodges, who served his apprenticeship with us, who was a particularly good servant, and who had consumption. He was a blower, and I consulted our doctor about him, who advised that he should be advanced from the stage of blowing to that of finishing, in order to relieve the strain upon his lungs. That was done, but he became much worse, and we put him back to blowing again, and he got very much better, which is rather evidence that the blowing tends to somewhat strengthen the organs.

10172. Have you any statistics from your managers of cases of other eye diseases apart from cataract?—No; because it is rather covered by the statement that they have only known of the few cases where men left work through a defect of the eye.

10173. The Committee had evidence from a manufacturer in Yorkshire, who said that there is some difference in the methods between that part of the country and other districts, in that inside the furnaces in their glass works there is some kind of partition which shades the eyes of the workers from the glare. Is that the case?—I do not think so. I am rather in a position to give an opinion upon that, because we have works in both districts; we have works at Hunslet and we have works in the north of England. All the furnaces are constructed on similar lines with the exception that some of the Yorkshire manufacturers have what they term a bridge, but it does not affect the glare at all, because it is beneath the level of the glass itself. It is called a bridge, and is a kind of partition which goes across and has loopholes for the metal to pour through, the object being to get a finer and better quality of metal; but it cannot possibly vary the glare of the glass because the metal flows to the level of the top of the bridge.

10174. Then is it your opinion there is no difference in the methods which would be more likely to make eye affections more prevalent in one part of the country than the other?—No. I think anything that might in the olden days have affected the eyesight is considerably reduced, because the furnaces used to be very much smaller, and they varied from one glare to another glare. Now they are continuous. In glass

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furnaces the metal is kept to a level height and is always at the same temperature and glare; so once the men have acclimatised their eyes to that there is not the difficulty that there used to be.

10175. Is that the practice in all the works now, or are there old-fashioned works still in existence?—There are a few old-fashioned works still in existence.

10176. (Dr. Legge.) Is Blaydon near Seaham Harbour?—Yes.

10177. Have you works at Seaham Harbour?—No, Messrs. R. Candlish and Sons have. We are divided into districts; we come under the North of England district—that is, the Newcastle, Sunderland and Seaham Harbour district—and Mr. Candlish, who is Chairman of the North of England District, was asked to give evidence, but he is abroad, though I think he wishes to give evidence when he returns.

10178. Then you are part of the same combine, shall I call it?—No. The men form the districts; there are wages and conditions peculiar to a district, and we combined ourselves with regard to wages, and so on.

10179. Do you know the Seaham Harbour Works?—Yes.

10180. Is there any material difference there in the finishing department to the conditions in other districts, do you think?—No, nothing at all.

10181. Do you know Dr. Robinson, and do you know of his statement with regard to bottle-finishers' cataract?—Is he a North-countryman?

10182. He is in practice at Sunderland?—I have not heard his evidence, but I believe he has made a study of the question, and I believe he has stated that the form of cataract that bottle hands are liable to get is a different form of cataract to any other cataract.

10183. It is different to the ordinary senile cataract?—That may be, but our point is that the percentage is so infinitesimally small that it cannot be attributed to the men's work; we say they would have cataract whatever their employment may have been. It might take a different form through the work, but the work is not the cause of the cataract itself.

10184. (Chairman.) Are there any other bottle works at Hunslet besides yours?—Yes, there is a firm of W. Brook and Son.

10185. On looking through the list of superannuated members of the trade from December, 1897, to December, 1905, I find that in recent years, since 1901, Hunslet and Blaydon seem to have been remarkably free from eye diseases, and that it is Castleford, Conisborough, and other places where they seem to be more numerous, but I notice that at Blaydon in 1904 there was a gatherer, aged 60, with senile cataract in the left eye, and removal of the lenses from the right eye, who came on the funds of the trade union?—Yes.

10186. And in 1904, in November, there was another bottle-maker at Hunslet, aged 66, with senile cataract in both eyes, and another man in 1904, aged 63, a

bottle-maker of Hunslet, with partial paresis of the right arm and much wasting of the muscles, with some opacity of the lenses, notably the right. The other cases at Hunslet are mostly those of constitutional diseases, but there were three men in 1904 who came on the funds of the union, you see?—Is that a list of the Yorkshire cases?

10187. No, it includes the whole country?—Have you the figures with regard to the Southwick Bottle Works, Sunderland?

10188. No. The list gives Blaydon in 1904, and there there was one gatherer who suffered from senile cataract in the left eye, and removal of the lenses from the right eye, which apparently was the only case from Blaydon in recent years?—That has rather been our point; we maintain that the percentage is very small.

10189. How many men have you employed at Blaydon?—The number varies, but the full complement of men, bottle finishers, blowers, and gatherers is 80 at each of our works.

10190. I find that at Hunslet in 1899, that is some years ago, there was a man who came on the superannuation fund suffering from optic neuritis, and another in 1900 suffering from traumatic cataract and loss of vision. Are there a very large number of bottle works at Castleford?—Yes, that is one of the largest centres.

10191. Are the methods employed there the same as are employed at other places?—They may differ. They make coloured glasses there more than we do in the North of England, such as amber and vegetable green glasses, which are made in smaller furnaces, and we admit there may be more cause for affecting the eye from furnaces which vary the glare than from those which do not. Have you had any evidence on the hours or length of time our men work, because allowance is made for all these things in our trade. The men only work five days in the week.

10192. Why? Because it is regarded as trying work?—It is hard work while they are at it. The nominal hours are 10 hours a day, but they have an hour and a half off for meals, so they work 8½ hours for five days in the week. The men's association of Yorkshire recommended the men wearing glasses at their work some short time ago; it was put to the vote amongst our men at Hunslet, but they objected to it; they will not wear them.

10193. They find the perspiration deposits on the glasses, do they not?—Yes, that is one reason.

10194. (Dr. Legge.) Do you have any blue screen before the hole to look into the furnace?—Yes, for the men who fill on the metal at the back, but they never use it. A sort of fan thing is kept there for the manager walking round to look into the furnace. Of course, the glare is greater where the metal is filled on than it is where the men are working, because there the hole is only 6 inches by 4 inches; that is all they look into, whereas the other is a huge hole.

Mr. DENIS MOORE, called and examined.

10195. (Chairman.) Are you a glass bottle manufacturer?—Yes.

10196. Are your works at Woolwich?—Yes.

10197. About how many men do you employ?—We employ about 250 blowers, and about 450 altogether.

10198. About how many of them are finishers?—In our case all the blowers are finishers.

10199. Do not you divide the processes?—No, we have given up the English system of work; we have no English glassblowers in our factory—they are all foreigners.

10200. The Committee have had evidence from one or two quarters to the effect that cataract and other eye diseases are unduly prevalent amongst bottle finishers. Have you had any experience as to that?—I cannot say that I have had a very large experience, and I only know of one case of a man in my employ having cataract, and he was not incapacitated from work by it until well on to 70 years of age. He was a man who had led an awfully bad life. Whether that would induce the cataract or not I do not know, but that is the only case I have known.

10201. Have you by chance seen the table of cases of men who have come on the superannuation fund of the

Bottle Workers' Union, and the reasons why they came upon that fund?—No, I have not. Mr. D. Moore.

10202. It shows a most remarkable proportion of men suffering from cataract; in fact, out of a total of 114 men who in eight years came upon the fund of that trade union, 33 were suffering from cataract, eight from defective eyesight, and seven others from other eye diseases, making a total of 48 out of 114?—The number of men who come on the superannuation fund would probably be a small percentage of the number of men employed, and the number of cataract cases is only a third of that number. But I should say, from my experience of these workmen, that their cataract does not come from their work. I think it might be aggravated if they were prone to it, but I fancy medical men could give the clearest evidence upon that. I should question whether it was possible to induce cataract from heat.

10203. From your long experience of the trade do you say it is never currently spoken of as a disease belonging to the trade?—No. I have been discussing lately with a large number of men from all over the Continent this very point, and they say that in Germany, where the industry is very much larger than it is here, cases of cataract are very seldom heard of.

Mr. D. Moore. 10204. Is it the case that in some glass furnaces there is a kind of appliance inside the furnace which helps to shade the workers from the glare?—They can fix up a coloured screen in front of the place where they work, but they are mostly too careless to do that. In our factory I dare say half the men do it.

10205. Apart from that, is there not something in the construction of the furnace—something called a bridge—which helps to save the eyes?—Yes, there is a bridge, but that would not assist; there must be sufficient heat to keep the metal in a fluid condition.

10206. Is there no difference in the construction of furnaces in one part of England from another which would account for a higher proportion of eye diseases in one part from the other; are they all very much the same?—They are all very much the same. There is a difference in the English system of work. The finisher himself is much more distressed by constantly looking into the furnace than any other member of the gang working under him.

10207. (*Mr. Cunynghame.*) Do you use a Continental shape of furnace?—We all use the same, both on the Continent and in England; there is no difference in the furnace.

10208. So that the immunity of your men from cataract could not be ascribed to a difference in the construction of your furnaces?—No.

10209. To what do you attribute the idea amongst the men with regard to cataract?—I think it is because the Trades Union are trying to get some benefit out of the proposed extension of the Workmen's Compensation Act.

10210. But the figures cannot be all imaginary, can they?—I think they should be all of them very carefully checked. I am astonished to hear that they allege that there is a great amount of cataract amongst them. The eye would naturally be one of the first organs to be assailed in our industry, but strange to say, we have old men of fifty or sixty whose eyesight is much better than mine, and I have never done anything but use a pen.

10211. (*Chairman.*) Are they finishers?—Yes, but in our form of the industry the men who finish do the whole work, and make the bottle from beginning to end.

10212. Is there anything else you wish to lay before the Committee?—No, I think I have included everything in the *précis* I sent the Committee, and unless you wish to ask me anything I have nothing to add.

10213. It is only the question of eye diseases which the Committee are investigating in connection with bottle workers?—In that connection I think you should rely more on medical evidence; at any rate, my experience proves that the men's eyes do not suffer very largely, or, in fact, that they suffer very little indeed, and it is possible for them to adopt means to shield their eyes; they can use coloured spectacles or glass screens in front of their work, and in our case they do so with regard to half of them.

10214. Why?—On the ground that they fear it might try their eyes. Some men have weak eyes; some believe that the work injures their eyes, and they take steps to protect them; while, on the other hand, many men do not believe the work has any effect on them, and they do not take those steps.

Mr. R. H. NORGATE, M.R.C.S., L.R.C.P., called and examined.

10215. (*Chairman.*) Are you the Medical Officer of Stapleton Workhouse, at Bristol?—Yes.

10216. Are you, in general practice, also in Bristol?—No, I am resident officer for the workhouse; I am not allowed to do anything outside. Previously I was surgeon to the Bristol Foresters' Society, and medical officer to the Kent and Worcester Asylums.

10217. Have you been at considerable trouble to review the cases of bootmakers who have entered the workhouse with which you are connected?—Yes.

10218. There have been 257 of such persons under your care, I believe?—Yes.

10219. Of whom 224 were admitted on account of sickness?—Yes.

10220. The workmen who enter the workhouse are of course not an average of the men employed in the trade, but they are below the average?—Yes.

10221. Do you think that they come from specially unhealthy factories?—The greater number of them, or they are men who, having originally been in better factories, owing to illness or having got into trouble, have had to go into second-rate factories, and many of them are men who have done work in their own homes.

10222. You speak in your *précis* of a number of diseases, such as insanity, eye diseases, cancer, and so on, but the purpose of this Committee is to investigate only diseases which are attributable to the employment in which the men are engaged. What diseases do you consider are directly attributable to working in the boot trade?—Phthisis, cancer, certain forms of eye trouble, certain forms of paralysis, certain skin diseases, bronchitis, and asthma, and insanity. Those are the most important.

10223. Have you any reason to think that more bootmakers are insane than other people belonging to the same classes living in the same districts?—I should say so. I get more cases, according to my figures. I have an average of 23 cases of insanity in the course of the years I have given, and that is more than the average in other occupations.

10224. But might not that perhaps be because there are more bootmakers dealt with than people employed in other occupations?—No, I should say not; we have a great many dock labourers and casual labourers in Bristol as well.

10225. In what way do you think the manufacture of boots gives rise to insanity, any more than the manufacture, say, of furniture, or hats, or coats?—I should

think it is due to the modern machinery, which is now used where there is such a terrible strain on a man, and at the same time with certain of the instruments there are sudden jars on the system; I think those two things combined produce such wear and tear on the people's minds that it has a tendency to cause insanity. Then there are also the sedentary forms of occupation, with nothing to take the mind away from the surroundings, and in those cases the workers have a tendency to melancholia.

10226. In how long a period did you have the 23 cases of insanity amongst bootmakers to which you refer?—In 8 or 9 years.

10227. How many bootmakers are there in Bristol?—I believe there are somewhere between 5,000 and 6,000, but my Union will only represent half the cases because there is another Union Hospital as well, so that you can multiply my figures by two in order to get an idea of the number.

10228. Or out of 2,500 bootmakers you have an average of about 3 who are insane?—Yes, and at the Asylum they have figures pointing to there being a large number. I give in my *précis* the number of cases admitted to the Asylum, 7 in 1904, 7 in 1905, and 5 in 1906, an average of about 6 a year.

10229. In addition to an average of about 3 a year at your workhouse, and 3 at the other workhouse?—Yes.

10230. That is to say, 12 a year out of 5,000 people employed in the industry?—Yes.

10231. Do you think it would be possible to require that compensation should be paid to those men on the ground that their insanity was due to their employment?—No.

10232. Similarly with regard to cancer, the connection between cancer and shoe-making is inferential, is it not; you merely say that there is a rather higher proportion of cases amongst shoemakers, but the numbers are so exceedingly small in proportion to the total number engaged, that it can hardly be said that cancer is a trade disease amongst shoemakers, can it?—No.

10233. Also with regard to eye troubles, what do you say?—I noticed when I went over a very large manufactory the other day that a great many of the men were wearing spectacles, which was quite exceptional. You could see more people in that particular factory with spectacles or eyeglasses on than you would ever see under ordinary circumstances, and I

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attribute that to the eye strain, and also to a certain extent to the light.

10234. Do you ever find a man entering the work-house because his eyesight has failed him through his occupation?—Yes.

10235. How many cases of that kind have you amongst bootmakers?—I have given you in my *précis* the history of 9, and there are more one would have to add because the eye troubles are part and parcel of the symptoms of paralysis which these men suffer from.

10236. With regard to eye disease, cancer, insanity or paralysis, in any given case could you say without knowing the man's history, "This man must be a bootmaker because he is suffering from this disease"?—No, I should not like to say that.

10237. But if you knew he was a bootmaker could you say in any given case: "This man is suffering from this disease because he has been a bootmaker"?—Yes, I should say so; I take that from the cases of ataxia in which the eye symptoms are very marked.

10238. But would not you find other men employed in other trades and persons who are not working men presenting exactly the same symptoms?—Not to the same extent.

10239. But if you took a given case? There might not be so many in the total?—There would not be so many. We have had quite a run of cases, and that is the reason why I specially mention it. We get a run of a particular case, and then perhaps we do not get any more for a time; but I have seen many cases recently in which the eye symptoms have been more prominent.

10240. With reference to diseases of the respiratory system, you had 36 cases of phthisis admitted, I understand?—Yes.

10241. Do you ever get cases of fibroid phthisis?—Not necessarily amongst bootmakers. I do not know of a case specially amongst them. Those cases seem to have been cases which have come in so far advanced that the whole lung has broken down very rapidly, and therefore the disease has been of very rapid termination, and I am unfortunately in the position that now the sanatoria have started I get the more advanced cases. I do not get them at the earlier stages.

10242. The phthisis then is indistinguishable, is it, from the phthisis which exists amongst the rest of the population?—I should say it is not distinguishable.

10243. (*Mr. Cunynghame.*) I suppose a trade like bootmaking would be a trade to which rather the weaker class of the children of the poor would be put?—Yes, I should think so.

10244. If a man has several children in a poor home he would put out the strongest to, say, probably dock labouring?—Yes.

10245. And to the weaker ones he would say, "You must take to shoemaking, because you will be sitting at it, and there will not be a call upon you for the same amount of manual labour"?—Quite so.

10246. Therefore one would expect in such a population to find the men of the weakest physique amongst the bootmakers, I suppose?—Yes, but against that I might say in the large factory I visited I was surprised to see the fine class of men I found there; whether it is exceptional to the boot factories of Bristol or not I cannot say. Undoubtedly the generality of bootmakers one sees coming out of the factories in Bristol are men of small physique.

10247. If they are men of poor physique or poorer physique than others, one would rather expect to find a greater proportion of all diseases amongst them, would one not?—Yes.

10248. So that it strikes me, looking through your list, even though there may be found amongst bootmakers a larger percentage all along the line of various diseases without any very marked or striking excess in any particular item, that would be rather due to the class of person going into the boot trade than to the trade itself, would it not?—Yes, I quite agree with you.

10249. To put it in another way, suppose people instead of wearing leather boots were to wear wooden shoes, and they made sabots, have you any reason to think if the making of sabots was substituted for the making of boots there would be very much difference in the figures you have given us?—I should not like to say, having regard to the amount of dust whether there would be the same amount of disease or not.

10250. You do not expect to find, would you, if they took to making sabots that the whole of your figures would be very much better?—No, I do not think I would.

10251. And if I were to substitute furniture making you would not expect to find them much better, would you?—No, we find many cases of phthisis amongst men who make furniture.

10252. So that really the examinations you have made produce rather a negative than a positive result, do they not?—Yes.

10253. (*Dr. Legge.*) Have you noticed any disease of the skin amongst any of the boot-makers you have had to deal with?—Yes; some years ago I had a series of cases of a peculiar skin rash affecting the fingers and the arms, and I had some difficulty at the time in deciding what it was. It looked like an ordinary itch first of all, but it got worse instead of better, and in talking to the men I found out that they had been using a stuff called chrysoidine. This stuff had been used for some little time, and they had got sores on their fingers, which seemed to have brought on a violent irritation, in some cases extending right up the arms. I had four or five of those cases one after the other, and then one of the members of the Board of Guardians—a Mr. Shepherd, who is interested in the boot trade—said, "I wonder if they have been using that stuff called chrysoidine," which he said was a very dangerous thing for the hands. The outbreak almost disappeared, but I saw one case about a year ago, and I have not seen any since. I have gone into the subject of chrysoidine, and have made some experiments with regard to it. When I was at a factory the other day I spoke to the foreman, and he told me it was not the chrysoidine which was dangerous, but the stuff which was mixed with it, and I found that oxalic acid, and I believe chromic acid and picric acid, was mixed with it. The foreman at the factory took some of the chrysoidine and put it on his tongue, and said it was not more dangerous than that, but some of the things they mixed with it caused the danger.

10254. (*Dr. Legge.*) What is chrysoidine chemically?—It was introduced in 1876, and discovered by Witt. It is a hydro-chlorate of diamidoazobenzene.

10255. (*Mr. Cunynghame.*) Is it a vaseline?—It is a coal tar dye. It is $C_6H_3H:NC_6H_3(NH_2)_2HC$, obtained by combining diazobenzene with m-phenylene diamine. I made several experiments with it, and you can produce very beautiful colours with it.

10256. Did you find out whether it was irritating?—I tried some, and it undoubtedly irritated my fingers.

10257. It was not the pure chrysoidine which caused it?—No; it was mixed with oxalic acid.

10258. (*Chairman.*) Do you find that the pure chrysoidine produces any ill effects?—No, none at all.

10259. (*Dr. Legge.*) Are you aware that oxalic acid is used on a large scale in dye works, and does not cause any symptoms?—No, I did not know that; but it takes the skin off the fingers.

10260. Supposing you had seen the conditions, and knew the history of the men suffering from the effects, would you have any difficulty at all in attributing them to their work?—If I saw a similar case I should know it again.

10261. Do you draw a distinction between illness caused in this way and illness resulting, say, from cancer as regards the question of compensation?—Yes, I should in this case. I think this is a case in which, if they are allowed to put other things with it which are of a dangerous character, a person should be compensated.

10262. How long does incapacity from the use of it last?—It varies from one to three months. I had one very bad arm in which the glands were very bad indeed, and I made several incisions.

10263. But, with the exception of one case last year, you have not seen any lately?—No; I saw several five or six years ago.

10264. (*Chairman.*) Did the foreman you refer to say he had had any cases recently?—No. He said he had heard of it, and I have seen men in a shoe-maker's shop who could tell me the factories where five or six years ago they had had cases of it.

10265. (*Dr. Legge.*) And where the use of it had been given up?—Where it had been given up for that reason—because of the intensely irritating effect on the skin.

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10266. (*Mr. Cunyngame.*) Are they using pure chrysoidine now?—Yes.

10267. Had the chrysoidine mixed with the oxalic acid a special name?—I do not know whether it was called chrysoidine or not. I did not discover it was called chrysoidene until the other day, when I went into it with an analytical chemist. The picric acid

which is used, I believe, gives you the most beautiful dye of all.

10268. Is that dangerous?—Yes, that is dangerous too.

10269-71. (*Dr. Legge.*) It is handled in very large quantities, is it not?—Yes, but you would not like to get it into a sore place.

THIRTY-SIXTH DAY.

Tuesday, 16th April 1907.

PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. WILLIAM HANCOCK, called and examined.

Mr. W. Hancock.
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(*Witness.*) Before we proceed will you allow me to hand in this letter from an eminent doctor of Newcastle, which was printed in our report last year, on the question of shortening the hours of labour in order to extend life?

10272. (*Chairman.*) Are you secretary of the Operative Masons' Society in London?—Yes.

10273. Have you been yourself a stonemason?—Yes.

10274. For how many years?—I have been secretary for 25 years. Previously to that I was apprenticed when I was fourteen, and worked at the trade until I became secretary.

10275. Are you of opinion that stonemasons suffer from any particular disease in consequence of their occupation?—Yes—phthisis.

10276. Is that the only disease on which you wish to give evidence?—Yes, tuberculosis and phthisis—lung diseases generally.

10277. Have you any statistics or definite facts which you can give the Committee as to the number of cases of such disease amongst the men in your trade?—Yes, I have a brief report from Newcastle.

10278. Showing that from 1871 to 1896 inclusive 160 masons died at Newcastle, 71 of them of phthisis, the average age at death being 42·23 years?—Yes.

10279. Does that mean the average age of all the men who died at Newcastle, or of all the men who died from phthisis?—That is the average age of all the men who died at Newcastle.

10280. Have you any other statistics?—Yes, I have some statistics from an annual report. I have not gone further back than 1895-6; if we go further back we find the figures larger, but since the shortening of the hours of labour we find the death rate has improved very much. I find in 1905 the deaths from all diseases were 253, and out of those 253, 79 died of phthisis or consumption, an average of 31 per cent.

10281. Is that for the whole of your society?—Yes.

10282. How many members have you?—14,000. The average age at death is 44 years from phthisis, and the average of the whole of the members is 51 years.

10283. Have you particulars of cases of men who may be ill and retire from the trade and then subsequently die from phthisis?—Yes.

10284. Would they still be members of your society?—Yes, we have a superannuation fund.

10285. At what age can the men come on the superannuation fund?—We have no age limit. We have many who come on at 40. We have a membership

limit. We find that young men who go on our fund, say at about 40 or 41, do not live long. The older men live a good many years, some of them. I can show you some certificates, if you like, proving the length of time they were ill from phthisis—some of them a very short time. I had a death case a fortnight ago from Manchester in which the man had had phthisis for two years, but worked up to the day before he died.

10286. Do the certificates from your doctors distinguish between fibroid phthisis and tuberculous phthisis?—Yes. We find that with fibroid phthisis the men live longer than they do when they are affected with ordinary tubercular phthisis.

10287. What proportion of the cases is represented by fibroid phthisis?—I have not the proportion, but I should say about half would be pneumonia phthisis and half fibroid phthisis.

10288. Has it occurred to you that it would be rather difficult to say, in any given case of a man who died of ordinary tubercular phthisis, whether he contracted the disease through his employment or not. Of course, there is a great deal of ordinary tubercular phthisis amongst the general population, is there not?—We often get a certificate from the doctor when the men go on our superannuation fund stating that they are suffering from "stonemasons' lung."

10289. Is not that fibroid phthisis?—Yes, in some cases.

10290. Is not it so in all cases?—I do not think so.

10291. There is unhappily a very large death rate amongst the English population from tuberculosis, that is, tubercular phthisis, and amongst the people who would naturally be expected to die from that disease are persons engaged in the stonemasons' trade. I am not speaking of fibroid phthisis, but supposing a stonemason died from tubercular phthisis, how could anyone say whether he contracted that disease from his employment or not?—The doctor would generally say so. I daresay it might be from some other cause, it might be a family complaint; but it is very rare, I think. It is generally set up by the dust.

10292. Do you think that tubercular phthisis ought to be the subject of compensation?—Yes.

10293. Supposing it were included in the schedule to the Act and a stonemason died of the disease, how is it possible to say whether it was due to his employment or not. There may be half a dozen men in the same town also dying of the disease who are not stonemasons; there might be furniture makers or cab-drivers or gentlemen of means dying of the disease, might there not?—I should think the doctor could

determine by the length of time he has treated his patient. I have known very strong young men who have contracted phthisis through the stone dust, and some of them have not lived many months. Some have given up the trade and gone on our superannuation fund and lived several years.

10294. But do not you know that people who are not stonemasons contract phthisis at an early age and die?—Yes.

10295. But you still think, do you, that a doctor would be able to say, in cases of tuberculous phthisis, that A was not a stonemason, he died of tuberculous phthisis, and the disease was not due to his employment, but B was a stonemason presenting precisely the same symptoms, dying at the same age, and his death was due to his employment?—Out of the number of deaths from phthisis of which I have particulars, some were from tubercular phthisis, the others were from phthisis brought about no doubt by inhaling stone dust.

10296. With regard to fibroid phthisis the case is very different, because that can very frequently be determined to be due to a dusty occupation; but my point is with regard to tubercular phthisis. Has not it occurred to you that there is very great difficulty in deciding between the two. Although one may have the idea in one's mind that tubercular phthisis is more rife in a particular trade, when you come to a particular individual, is it not difficult to say that his disease is due to his employment?—As I say, we have very few tubercular cases which is consumption.

10297. Then you attach much more importance, do you, to fibroid phthisis?—Yes. As I say out of 79 men in 1905 who died of phthisis, I think two died of tubercular phthisis.

10298. Are the others stated to be cases of fibroid phthisis?—We put them in our annual report as phthisis.

10299. There is another point on which I should like to have your opinion, and it is a very important point. Suppose fibroid phthisis were included under the Workmen's Compensation Act, and there was no difficulty in determining that it was due to the employment, and a man if he got fibroid phthisis could claim compensation, what would be the position of working men who were suffering from the preliminary symptoms of fibroid phthisis—who caught bronchitis occasionally, who were perhaps looked upon as asthmatical. Have you considered whether employers of labour would not be disposed to dismiss those men before they became incapacitated from fibroid phthisis in order to prevent the possibility of a heavy claim for compensation?—Possibly so. I have considered that and possibly they would do so.

10300. That is a point which is very much in the mind of the Committee, and I should like to know what is your opinion of the comparative advantages of including or excluding fibroid phthisis. The point I want to put to you is this: If the inclusion of fibroid phthisis had the result that men did not get any compensation because they were dismissed as soon as they showed any symptoms that might lead up to fibroid phthisis, would it be to the advantage of the working men or not to include it in the schedule?—Possibly it might not be to the advantage of the workmen, but my society carried a resolution that the case be laid before you seeing that we have such a large percentage. We had 31 per cent. dying of phthisis in 1905; we had 32½ per cent. last year, and if I go back ten years I find a considerably larger percentage. We have somewhat reduced it by shortening the hours of labour.

10301. Admitting for the moment for the sake of discussion that fibroid phthisis is a trade disease among stonemasons, and that numbers of them die of it, and that it would be quite reasonable for the employers to be made to pay compensation, the point I put is, is it to the advantage of the stonemasons—the working men—to include this disease, with the possibility that no one may ever get the compensation, because men who showed the preliminary symptoms would straightway be dismissed?—Yes, but my society is of opinion that we should try and get it incorporated in the Act under dangerous diseases. We have taken a resolution on it.

10302. Have your society considered that point?—I think so. I agree with you that in many respects it would be detrimental to us, and an employer would be very careful not to employ men who looked anything like consumptive. I quite agree that it would have that effect, but at the same time my society thinks it

should be included in the dangerous diseases for compensation. I think they have studied both sides of the question.

10303. Are you aware that it has been said that the Workmen's Compensation Act already prevents men who have some physical defect, such as the loss of one eye, or who may be infirm in some way or other, from getting employment because employers will not take the risk of their having an accident?—I believe that is so.

10304. Would not that be very greatly increased in the case of phthisis, which is unlike lead poisoning and anthrax and phosphorus poisoning, because it is a disease which takes a longer period to develop. You cannot say a man has got the disease, and he must stop work and get compensation, as there might be five, eight, or ten years of preliminary symptoms; and during that period he may be liable to dismissal, and lose his work altogether, might he not?—Yes, we have seen that difficulty. Ours is casual employment, too. One of our men may work three or four months in a year for one firm and three or four months for another firm. We have very few who are employed permanently. We have reviewed these difficulties, and my society is anxious that it should be included if the Committee can see their way to do it.

10305. How long do you think a man works at the trade before he gets fibroid phthisis?—It varies. We have many who die at 23, 24, and 25 years of age; some live to 50.

10306. Would the average period be quite ten years before a man contracted the disease?—Less than that I should think. I should put it at five.

10307. The men going from one employer to another would in the course of that five years be employed by a number of different persons, I suppose?—Possibly.

10308. Who do you think ought to pay the compensation supposing at the age of 23 a man got fibroid phthisis and was incapacitated for the rest of his life?—I suppose that would depend entirely on where the man worked last, and how it could be traced back. We have reviewed that difficulty. In some cases we have men employed for years at one place; but that is only in some cases. The majority of our men have casual employment. We have seen the difficulty, but I think it could be overcome.

10309. How?—I think the Act does it somewhat.

10310. The Act takes into account only persons who have employed the worker during the previous twelve months. They may be brought in, but that applies almost wholly to diseases which arise with a certain amount of rapidity, and are not of such slow growth as fibroid phthisis?—We have many cases of fibroid phthisis where the men only live a very short time.

10311. Let me put to you what might be a common case if this disease were scheduled. An operative stonemason, say at the age of 25, has been working for the last five or six years for half a dozen different employers, and he begins to show symptoms of fibroid phthisis, would he be able to find employment once he had shown those symptoms, and if he did, would it be fair to the last employers who had employed him before he was incapacitated—perhaps only for three or four weeks, perhaps for three or four months—to be made to pay the whole of the compensation when the man had been contracting the disease through a series of years?—Practically it would not be fair, and I quite agree with you that it would very likely be detrimental to many of our men getting employment, but at the same time the same thing might apply to lead poisoning and other things which you have scheduled. How do they manage?

10312. In the case of lead poisoning there is a mutual insurance society amongst the employers, which covers a large proportion of the employers in the Potteries; besides which lead poisoning is not of such slow growth, there are many fewer cases, and the men and women often recover after a comparatively short period, so that the burden is small, and it does not matter very much whether it is this employer or that; but when you have the case of a man who might live for 10 or 15 years receiving half wages all the time, what do you say?—I suppose the insurance would meet it; the employers would insure and get over the difficulty, I expect.

10313. Has your society thought out any plan by which these difficulties might be met?—No, they have seen the difficulty and reviewed it, but we have taken

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it that the same difficulty occurs in the other trades that are scheduled.

10314. (Mr. Cunyngname.) Suppose you have a young man beginning the trade, at what age does he generally begin to be a mason?—He is apprenticed generally at 16 or 17 years of age.

10315. Taking a young man about to be apprenticed, what chance do you think there would be of his being attacked more or less before he got to the age of 25—that is, in nine years?—I could not say what chance there would be.

10316. Can you give the Committee any idea from the figures of your society. The Committee have to form an idea of what is likely to happen in dealing with these figures. What proportion of young men, if you start 100 at 16, would you expect at 25 years of age to be affected?—That would somewhat differ in different districts.

10317. I will put them all together. Let your young men be apportioned amongst the districts, and, taking the subject as a whole, what would you say?—I should say the proportion which I have here, which is the only proportion I could get from our statistics.

10318. What would it come to, 1 in 10 or 1 in 20, do you think?—Taking the year 1905 there were 79 out of 253 who died of phthisis.

10319. But it will not do, will it, to take that proportion, because that applies to men up to the end of their lives, while I want you to take the first 10 years. The figure would be much smaller, of course, would it not?—Yes, but the young men die more rapidly.

10320. Then consider what that means. You have an employer who, if he takes on young men at 16, will run the risk that one in four will have to receive half wages during the rest of his life after he is 25?—We find that the men who go on the superannuation fund young for phthisis die very quickly. The men who go on from 40 years of age live a considerable time when they leave the trade. The young man sticks to the trade as long as he can in order to get a livelihood, and eventually comes on the superannuation fund.

10321. That hardly meets my point. Suppose you are an employer taking on a young man of 16, are you likely to take him on if the chances are one in four that you will have to pay him half wages for the rest of his life?—I quite follow. Your reasoning is quite logical that it will be detrimental to the men.

10322. I want to put one other point to you before you answer. What sort of stone chiefly is cut by the men doing this work. What is the chief purpose for the use of the stone?—For building.

10323. Would not it be very likely if the cutting of that stone became expensive from any cause, either you would get imported cut stone, or you would get Portland cement, or artificial stone made to replace it?—I do not think that would apply. I think now they get the cheapest material they can.

10324. Yes, that is the cause of the present price of stone; but if you had to pay a young man his ordinary wages, plus the sum necessary to insure him, with the risk of one in four going off at 25, which is a tremendous risk, would not that raise the price of stone so much as to throw a great many people out of the trade—should you say it is different to the case of lead, which is a small risk. The amount an employer has to pay to insure his people against lead poisoning forms a very small item as we know, and that is the reason it has been included. It is so small, but here it is very serious, and therefore do not you see it might throw the men out of employment?—You are drawing a very severe point in the matter.

10325. I am wishing to get the figures from you. I should have thought they would not be so large as one in four, but still they would be heavy, would they not?—Yes.

10326. The figure is not mine?—You see, in taking the average age at death for the year 1905 it was 51 years and 4 months, but of the men who died of phthisis the average age was 44 years.

10327. I understand you would argue from that that the risk would not be so very great, but the answer to that is that the Workmen's Compensation Act does not only contemplate death, but it contemplates compensation for inability to work and throwing men on the funds for the rest of their lives. It is a bigger liability than death a great deal, is it not?—Yes, but you will

find by the statistics of our society that the young men who are taken with phthisis live but a very short time.

10328. Would it not be fairer to say that if the disease was scheduled at all there ought not to be compensation under a certain age; that up to a certain age a man runs his risk, but beyond some particular age the compensation should begin. That would warn a young man to go into some other occupation, and change his profession. Would not it lighten matters very much if you were to make the age later?—Yes, possibly so, but I do not think that would give satisfaction.

10329. In other words you would rather have the whole cake than half or quarter the cake?—Yes.

10330. Are you sure that in trying to get the whole cake the men will not lose a very large portion of it?—Possibly so, but I do not think the half measures would be satisfactory.

10331. What is the average wage of stonemasons?—It varies from 6d. per hour up to 10d. according to the districts.

10332. What is the average of hours worked per week?—In London we work fifty hours per week during the summer, and forty-four in the winter.

10333. So that 25s. to 35s. is the average weekly wage, is it?—It is over £2 in the summer.

10334. Then your proposals do not go beyond phthisis; they would not extend to bronchitis, would they?—No, we have lots of deaths from bronchitis and pleurisy, but we only ask for phthisis to be included.

10335. You are perhaps conscious that if you began with bronchitis it would make the thing so big as to be practically unworkable?—Quite so, we only ask for tuberculosis and phthisis to be included.

10336. Do not you think you would be wise in abandoning the tubercular form of phthisis as a thing which can be got by all the population, and sticking simply to fibroid phthisis, which you really can more definitely say is due to the trade?—Yes, but it would not be very much if tubercular phthisis was included, because only four died from tuberculosis in 1905.

10337. But do not you think you had better stick to fibroid phthisis rather than go for the other?—Yes. I quite accept your suggestion that it would be detrimental to the men.

10338. There are a great many more things to be considered than merely taking a pen and writing this down in the schedule. That is one thing to do, but there are a great many things to be considered before doing it, and if you could lighten the ship in some way it would be a great benefit, would it not?—Yes, no doubt.

10339. (Professor Allbutt.) Do not you think another answer might be that in the midst of all these difficulties and complications the way out of it is for the masters and men together to try and establish a system of prevention?—Yes.

10340. How do you think a system of prevention could be established in respect of the work? In what part of the work is it that the inhalation of the dust is greatest?—Working in the workshops—in the sheds as we call them. We have sometimes a long shed, and if you are at one end of the shed you cannot see to the other end for the fine dust, which is what the men inhale, and which gets on their lungs. Of course, men employed in outside building are not so liable.

10341. The men working outside do not suffer at all perhaps from fibroid phthisis?—Not so much perhaps.

10342. They might be subject to bronchitis from exposure, but they would not suffer from the dust?—No.

10343. It appears to me that prevention may proceed on one of two lines or on both; that is either leaving the dust alone and trying to prevent the inhalation of it, or trying to disperse or suppress it; which is the easiest thing to do, to try to suppress the dust, or to wear some kind of respirator or sieve which would prevent the inhalation of particles?—I do not see how you could suppress the dust even if you throw water on the stone, the hard grey stone is of such a nature that the dust would fly every time you struck a blow on the chisel. A respirator would certainly be a preventive to some extent, but that would be a detriment. If a man went to work in a mason's shop with a respirator on the employer would think he had consumption and discharge him at once.

10344. Did you say that application of moisture would not prevent the dust?—If the spray was continually put on the stone it might.

10345. There is no difficulty about that, is there?—I should not think so, but then you see the men would be wet in their feet, and standing at the bench all day, they would catch cold.

10346. If the work was moist work the dust would not rise, would it?—No, if it was moist work.

10347. And if the floor was more or less moist the dust would not rise?—No.

10348. So that the dust could be prevented?—Yes.

10349. Is there any other way of allaying the dust by fans or anything else?—I do not think so.

10350. Is the only way of allaying the dust by water?—Yes, and that would be only temporary because the stone is so very hard. When the mason is chiselling a stone you can see the fire at every stroke, and that is where the dust comes from. Suppose you had a piece of stone well saturated with water, in ten minutes it would want saturating again.

10351. I am supposing a continuous spray?—Then the wet you would get at your feet would do more harm perhaps than the dust.

10352. That is another point, but a continuous spray would prevent it, would it not?—Yes.

10353. There are means of protecting the feet which might be used. Is that the only way in which you think dust could be prevented?—I do not think it could be prevented without a continuous spray.

10354. You do not think fans or other such apparatus would be of any use?—I do not think so.

10355. You have seen hoods, have you not, with exhausts?—Yes.

10356. Would they be quite inapplicable?—I think so.

10357. Supposing, then, the dust must necessarily be caused, are there no means of preventing the inhalation of it, such as wearing a respirator?—Those are the best means no doubt.

10358. What would be the objection to it?—There are difficulties with regard to that. In my opinion, when I worked at the trade, if a man came into a shop and put a respirator on the foreman would get notice to remove him as suffering from consumption.

10359. But you are not going to bring that conceit up as a serious argument, are you? Supposing it to be made compulsory?—That would be different.

10360. A man would rather wear a respirator than die of phthisis, would he not?—I would myself.

10361. So your objection would not be a serious one, would it?—No; if it was a custom, of course it would be accepted.

10362. What I thought perhaps you were going to say was that a man could not work with it?—I do not see why he could not work with it.

10363. (Dr. Legge.) I think you said that 32 per cent. of the deaths amongst the members of your society were due to phthisis?—Yes, 32 per cent. last year.

10364. Do you know that, out of 100 deaths from all causes of men between the ages of 15 and 65 years in the country, 19 are due to phthisis?—No.

10365. So that under ordinary circumstances 19 out of those 32 deaths would probably have occurred without any relation to the kind of work?—Yes, if those are the statistics probably it is so.

10366. Therefore, you are asking, are you not, that compensation should be paid in cases where more than half the deaths might not have arisen in any way from the nature of the work?—The reason we are asking that it should be scheduled is because of the percentage of men that die in our own trade through phthisis. We have not taken a general average. You see, when we got 65 last year out of 198 deaths from phthisis, it seems rather a serious thing, and a thing that should be scheduled.

10367. Have the members of your society been paying in certain sums against this and other forms of sickness year after year?—Yes.

10368. And is your proposal now that those payments should cease, and that a considerably larger sum than the men now get should be paid by their employers?—I do not quite follow you there. We do not insure with the employer in any way, if that is what you mean.

10369. No; what I mean is this: You want the sums the men are now receiving from the society to come

from the employer under the Compensation Act, do you not?—Yes, and we should pay them as well.

10370. They would not cease paying contributions to your society?—No, we pay sick pay, accident pay, and an old-age pension—what we call superannuation. We have about 600 members, on that superannuation fund, and a very large majority of them are on for phthisis now.

10371. Do you think if some other system could be devised whereby a smaller sum than the Act would involve were paid to some central fund, in addition to the sums that your members pay, it might be better?—Do you mean an arrangement between the employers and the trade, to pay a sum as a kind of insurance?

10372. Yes?—Yes, that might be done, but you see the difficulty with us would be the casual employment. We have what we call yard clubs, where the men pay so much a week for sickness, and so on, while they are there.

10373. There is so much sickness which cannot be attributed directly to the employment, that I am afraid false hopes will be raised in the minds of the members of your society. They would expect that in every case of illness due to disease of the lungs, compensation would be paid, would they not?—I do not think so. Of course, that would have to be pronounced by the doctor. We have deaths from many other causes—bronchitis, and so on.

10374. (Mr. Cunynghame.) But compensation would not be payable in respect of the 32 per cent., but only as to the 13 per cent.?—Yes.

10375. (Chairman.) Have you anything else you wish to state to the Committee?—I should like to mention the case of a man, aged 40, dying of phthisis, and cases where the doctors certify stone mason's phthisis; a man superannuated in 1906 died about a month after superannuation. I had a case this week of a man dying in Manchester who worked up to about two weeks before he died.

10376. (Mr. Cunynghame.) Speaking from a broad point of view, do you think it probable that in the long run the expenses of the Workmen's Compensation Act will fall on the wages. What is your view about it, that it will or will not?—I have thought of it, and, in fact, my opinion is that it should be something after the style of the old-age pension—subscribed to by the men as well as by the employers.

10377. I was not saying so much what it ought to be, but as the law is without any provisions for subscriptions, do you think it would lead to a reduction of wages ultimately if an employer has to pay so much for the insurance of the men, is it your view that it will come off the wages or not?—No, I do not think so.

10378. How do you think it will be provided?—They will make provision in their contracts or estimates.

10379. You think the public will have to pay it, do you?—Yes.

10380. And you think the workmen will not pay any of it at all?—No, nor the employer.

10381. So that whatever the sum the law directs should be paid to the workmen, it will always come from the public and not from the wage earners—that is your view of political economy, is it?—Yes.

10382. Is that the view of your union?—I think so; the employer insures to make himself safe. If you and I were contracting for a large building we should certainly make provision in our contract.

10383. Then according to that the building would cost more, would it not?—Yes.

10384. Then less buildings would be built, would they not, or do you think from some mysterious source more money would come to pay for any amount of building?—As a rule, the public has to pay for everything; buildings are a necessity, you see.

10385. Buildings cannot be imported from abroad, but stone can?—Yes.

10386. In the views you have been expressing, the political economy considerations are based on the grounds you have put before us, are they?—Yes. The contractor would not be anything out of pocket by your scheduling us at all.

10387. Nor the workmen; the public would pay for all?—Yes.

10388. And if the public pays for all, all the way round, where is the extra money to come from? Have you thought of that?—From the public, of course. It

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was in consequence of the number of deaths occurring from phthisis that my society passed a resolution some time ago to approach the Committee.

10389. (*Chairman.*) The difficulty is not in proving that the disease is due to the employment, but it is in connection with the consequences that would occur to the men if it were scheduled?—We have taken that into consideration, and it would be detrimental, no doubt, in some cases. An employer would say to a foreman, if he saw a sickly-looking man in a shed, "You had better get rid of that man, I do not want to run any risk."

Mr. JOHN LOAKE (of Loake Brothers, Kettering, Vice-President of the Incorporated Federated Association of Boot and Shoe Manufacturers of Great Britain and Ireland); Mr. J. GIPSON CLARKE (of J. Gipson Clarke and Co., Leicester, boot manufacturers); Mr. W. BEALE (of Beale and Co., Northampton, boot manufacturers), called and examined.

Mr. J. Loake,
Mr. J. G.
Clarke and
Mr. W.
Beale.
Mr. Loake (*speaking*): I have been connected with the boot trade for 40 years, 27 years as a manufacturer and previously as an employé, so that I am thoroughly in touch with all the conditions affecting the trade. I should like to give evidence on the two points of phthisis and chrysoidine poisoning, and I have got some outside opinions. I went to see our Medical Officer of Health at Kettering and three other doctors who had been in practice at Kettering for many years, and asked them three questions. I asked them: "Are you aware of any case of phthisis occurring in a boot or shoe operative working in the finishing department which can be said to be due to the special condition of his employment? (2) Do you know of any special conditions in the finishing department of a boot factory which are likely to predispose an operative to phthisis any more than in any of the factory life? (3) Are you aware of any case of chrysoidine poisoning resulting from working in the finishing department in a boot factory?" Those questions I submitted to four doctors in Kettering, and in each case I got the same answer. Dr. Van Vestrant writes in answer to question 1: "No, I am not. I have practised for 13 years in Kettering and for 16 years in Sheffield and Birmingham, and am of opinion that this disease is no more common among the shoe operatives of the former town than it is amongst the workers in the various trades of the two latter cities. I have not found the disease more prevalent in the finishing department than in any other." In answer to question 2 he says: "No, I do not. I visited Messrs. Loake Brothers' finishing department and found the atmosphere particularly clear and fresh, a condition no doubt due to the ventilating and suction fans kept going for the purpose of keeping it so." In answer to question 3, he says: "I have never seen a case or heard of such a disease as 'chrysoidine poisoning'; indeed, I was not aware that this dye was used in shoe work until now." That is the opinion of Dr. Van Vestrant, who has practised very largely amongst boot operatives in Kettering. I next submitted the questions to Dr. John Allison, the Medical Officer of Health for Kettering, who has been in practice 21 years, and he simply wrote "No" to all the questions. The next doctor I consulted was Dr. Dryland, who has been in practice in Kettering for a number of years (as was his father before him, and who was medical officer for the Board of Guardians for many years), and he writes me in answer to the questions, "No." Both the latter gentlemen are in practice at our hospital, too, which is supported by voluntary contributions, and in which they are largely interested. Many cases of illness go to the hospital, so that those doctors in particular would be conversant with the diseases or complaints amongst the workers. The next doctor I consulted was Dr. Roughton, who has been in practice for many years in Kettering. You see they refer to the questions of fans. I do not know what there can be in finishing machinery as likely to cause phthisis except the dust.

10394. (*Chairman.*) Does that evidence relate to workpeople engaged as clickers?—I asked the question with regard to the finishing department especially, because that, I thought, was the evidence required.

10395. It is the clickers about whom the Committee have received more evidence than as to the other workers?—I have the letter here in which your telegram is quoted: "Evidence particularly required as to phthisis amongst boot finishers and poisoning by chrysoidine."

10390. Then what is to happen to the man?—I suppose he would have to get employment somewhere else.

10391. In some other trade?—In some other trade.

10392. Is it a highly skilled trade?—It is a highly skilled trade.

10393. How long an apprenticeship does a man serve to the trade?—Five or six years. The trade is similar to what you see before you in this building—preparing the stone for building and fixing and moulding it. If you want any further proof with regard to the ages of the men I can give it to the Committee.

10396. Can you say whether amongst the clickers there is more dust evolved in the operations in which they are engaged than in other branches of the trade?—There is no dust at all evolved; they have perfectly clean skins on a board and cut them up with a sharp knife. I have been a clicker by trade all my life, so that I know exactly what I am speaking about.

10397. Do the men bend over their work in a constrained position?—Yes, they do bend slightly over their work, but they have their boards at a reasonable height, just as high as they like. Tall men do not bend unnecessarily; they have their boards propped up to suit them.

10398-9. (*Dr. Legge.*) And being such light work does the weakling of the family rather incline towards clicking than finishing as an occupation?—I have never heard it suggested. (*Mr. Beale.*) Might I say that I consulted the Medical Officer of Health in Northampton on this point. Some time ago, at a meeting of the members of the Royal Sanitary Institute, in a paper he read, he mentioned that the clickers were the men who mostly suffered from phthisis, but he did not attribute it to the fact that they worked in an atmosphere that was not healthy, or to bending over their work, but he said being the lighter employment in the trade, the parents mostly put their weaklings to the work.

10400. (*Chairman.*) Do you agree with that?—Yes, I do. I think that is why we get more phthisis in the clicking room. (*Mr. Loake.*) My personal experience is that there has been more phthisis in the clicking room than in the finishing department. In connection with the finishing department every machine is fitted with a suction fan, which draws away not only the dust but the air which the men are breathing, and the doctors who came to our factory for the purpose of examining the conditions in the finishing room said it must tend to promote health and make phthisis less likely, because the people could not possibly breathe the same air twice.

10401. To what do you attribute the prevalence of phthisis in the clicking room?—I really do not know. It has been often a matter of anxiety as to what was the cause of it. I cannot imagine it is the nature of the employment; I think it is very largely because the men will not have better ventilation. They are so susceptible to draught, or they think they are, that if we keep ventilators open they bung up every place they can with rag or paper, and close the windows directly. That is one of the greatest mistakes made by clickers. We have Blackman's fans in the roof always, which they cannot interfere with, driven by the main shaft.

10402. Do you get cases of fibroid phthisis amongst the clickers, or are they cases of ordinary tubercular phthisis?—I am afraid I cannot answer that question, but with regard to phthisis in the clicking room, the phthisis which has occurred in our own place has been connected with distinct and definite families. We have had one family—a family of Chapmans—where the father died of phthisis, two daughters died of phthisis, and one of the sons died of phthisis, so that there was a natural predisposition to phthisis. With regard to this point, it seems to me very important, because we find it developing itself in such a subtle way, and whatever may be done with regard to attributing it to any particular cause, I think it is impossible to say that it can be definitely traceable to any particular cause. According to the medical returns of our own Medical Officer of Health, the death

rate in the boot trade, as a whole, is lower than in many other trades, and is very favourable. It is even lower than in the medical profession, and according to the returns published from other boot centres, the deaths from phthisis in the boot trade are not perceptibly higher than those amongst people of no employment and retired.

10403. Have you anything to add to Mr. Loake's evidence, Mr. Beale, on this point—apart from the question of chrysoidine?—(Mr. Beale.) With regard to phthisis in Northampton, I have been told by our Medical Officer of Health that there is a decline in consumption in Northampton. In 1901 there were 104 deaths; in 1902, 126; in 1903, 114; in 1904, 104; in 1905, 99; and in 1906, 80. In 1903, out of the 114 deaths, there were only 32 in the boot trade; in 1904, out of the 104 deaths, only 47; in 1905, out of the 99 deaths, only 30 in the boot trade; and in 1906, out of the 80 deaths, 26 only were in the boot trade. At the last census in 1901 the population was 87,021, and the numbers engaged in the boot trade were 16,211, so that only a fifth of the people in Northampton are engaged in the boot trade.

10404. About a fifth of the numbers and about a third of the mortality, according to those figures?—Yes, that would be so. (Mr. Loake.) There is one point I omitted to mention, and that is what a serious matter it would be for the workpeople themselves if this disease were scheduled, because every manufacturer would be bound to have the workpeople examined periodically, and if there was the slightest symptom of weakness they would have to go. Then we might take people into our employment suffering from phthisis without the slightest knowledge of the kind, and long before the thing has been discovered we should be liable.

10405. Have you anything to add, Mr. Clarke?—(Mr. Clarke.) I should like to corroborate what Mr. Loake has said with reference to the clicking department. I have not looked up much information with respect to phthisis amongst clickers, but in reading Dr. Mallard's report, I notice, as showing the difference in the importance he attaches to the clicking and the finishing room, that he only devotes about six lines to the clicking room in connection with phthisis, while he devotes about a page and a half to the subject in dealing with the finishing room. With regard to our firm, in 10 or 15 years we have only had one case of phthisis in the clicking room. He gives figures for Leicester, and for 1905 there are 2.62 per thousand deaths in the boot trade from phthisis; in other trades, including hosiery, the rate is 1.75, and the rate amongst those he is unable to classify is 2.26, nearly as large as the deaths amongst those engaged in the shoe trade. Then Dr. Mallard points out that in the old days, 12 to 20 years ago, finishers used to work in unhealthy rooms, many of them worked in their own homes, and were bending over blue lights or gas lights in heated atmospheres with the boot pressed against the chest, and developed what was termed in the trade boot maker's chest. Afterwards there was a revolution with regard to the finishing work; men came inside to work, machinery was introduced, so that one has to consider the matter in connection with the old methods, under which men, through the conditions I have mentioned, were predisposed to consumption, because many of those men are engaged in the finishing rooms to-day. Then he sums up with regard to the boot and shoe trade generally by saying that with proper ventilation and attention to the shafting, as mentioned by Mr. Loake, so that the air is kept pure, he sees no reason why the boot trade should be termed an unhealthy trade. I may say that in Leicester the number of boot manufacturers is decreasing: the smaller ones are being eliminated. I think something like 40 or 50 during the last 12 years have retired, or for some cause or other have disappeared from the ranks of the boot manufacturers. The larger people are those to whom this question of sanitation and ventilation applies, and the Leicester factories to-day are well ventilated, the shafting arrangements are being attended to by the manufacturers themselves, and if there is any machine invented, or any different method for improvement from the workers' point of view, expense is not spared in Leicester. So that taking Dr. Mallard's report, I do not think it can be said that the death rate amongst the shoe trade in Leicester from this disease is at all excessive. Then there is another thing in connection with the shoe trade Dr. Mallard mentions, that is, that he investigated the percentage in these cases for 1905, and he came to the

conclusion that about 54 per cent. of the people who died had some relatives who had either died from or were predisposed to phthisis. Therefore many of these people are predisposed to the disease before coming into the shoe trade, so that it appears to me to be hardly fair to penalise the trade by scheduling them under this heading. Then there is another point. It is difficult, as Mr. Loake has said, to lay down in definite lines with regard to the shoe trade, that the industry is responsible. We have had one or two cases of delicate men who have married, and I remember one case particularly which came under my personal observation. It was common talk amongst his colleagues that the man never ought to have got married, because he was in a delicate state of health, and from the date of his marriage he developed symptoms, and ultimately died of consumption. That is a point which has to be borne in mind. If the disease can be proved to be directly due to the man's employment, it ought to be scheduled, but it cannot be proved, and I am quite sure it would be detrimental to the operatives themselves if the disease were scheduled. We have a man in our place who has suffered from appendicitis, who has been away for three months, and we have kept his place open. He is restored now, and at work. Other manufacturers in Leicester do the same thing, but it is quite evident that if this disease was scheduled, the insurance companies would certainly suggest, in a case of that sort, that a man's position should not be kept open for him in case he should develop something else. There are, no doubt, in the boot trade, many people who are delicate, but who will never die from phthisis; but if the disease were scheduled I am convinced that the manufacturers would have to seek advice from medical men, and the result would be that if a man was at all delicate, whether he had phthisis or not, he would be under observation, and ultimately find himself amongst the unemployed. Therefore that is a question which will require very serious consideration by the Committee before they schedule anything in connection with phthisis; because, as I say, it is pretty well impossible to trace that a man or woman has died from phthisis as the result directly of his or her employment.

10406. With regard to chrysoidine poisoning, the Committee have had evidence that some few years ago, and especially at Bristol, there were a considerable number of cases of poisoning causing ulcers and other injuries in the arms, which were proved to be due to this substance, or to something which was mixed with it. Is chrysoidine used now at all for the dyeing of parts of boots?—(Mr. Loake.) Yes, it is, diluted.

10407. Is it used generally?—We have always used it, more or less, for 27 years. Our foreman, who has been with us for 12 years, and was foreman at Leicester previously, has used it, and has never found a case of poisoning or any injury arising from it. Dr. Roughton, who visited our factory, appealed to one of our men who used it. He said, "How long have you used this chrysoidine stuff?" The man said, "About 30 years." "Have you ever had any injury from it?" "No." "Have you ever seen anybody who had?" "No." The next man said he had used it for 20 years, and had never found any injury; and I, personally, have never heard of any poisoning from its use. The four doctors I have referred to also say that they have never known a case.

10407*. It seems possible that the poisoning may have been due to something which was mixed with the chrysoidine, in some cases oxalic acid, in other cases picric acid, and in other cases chromic acid, and it is possible that these ulcers may have been akin to the ulcers found among dye workers from the use of chrome. Do you use the chrysoidine diluted simply with water, or mixed with a chemical?—We have used it mixed with oxalic acid.

10408. Have you found any evil results arising?—Never. One of the men to whom the doctor spoke said that if you had a cut it would make it smart, but that is all. We were never conscious of any danger with regard to it. I went to the chemist in Kettering, who supplies it to us, and he said, "I should not have thought that chrysoidine would have been sufficiently poisonous to be of any danger." I think he said they did not label it as poison, and he looked up a book and found that it was used internally. Diluted as it is diluted in factories, I should think it is perfectly harmless.

Mr. J. Loake,
Mr. J. G.
Clarke and
Mr. W.
Beale.

16 April 1907.

Mr. J. Loake, 10409. Have you ever used it mixed with chromic acid?—No.
 Mr. J. G. Clarke and
 Mr. W. Beale.
 11 April 1907.

10410. The evidence is conclusive that a number of bootmakers did suffer from severe ulceration, which incapacitated them from their work for many weeks, which could be attributed only to this material, or something mixed with it. That was about five years ago?—Would there be any possibility of mistaking it for anything else?

10411. There was a run of cases at Bristol at one or two factories, all occurring simultaneously?—Is it known in the medical profession as being a symptom which nothing but chrysoidine produces, because that is the point. Lead poisoning is distinguishable as such, anthrax is distinguishable as such, but I think it is very important to ascertain whether chrysoidine poisoning is of such a character that it is distinguishable as such from the specific symptoms.

10412. That, of course, is a matter for investigation?—It is a very important matter to consider before you schedule it.

10413. Have you anything to say on the subject of chrysoidine, Mr. Beale?—(Mr. Beale.) I can hardly add anything to what Mr. Loake has said.

10414. Have you ever known of any case of ulceration amongst the men who used the substance?—No. I have been engaged in our own factory for a matter of 20 years, and have always been about the different departments all the time, and I have never known of a case of poisoning from the substance mentioned. In fact, the stuff is not labelled poison; it is only the oxalic acid which is labelled poison.

10415. Is it usually mixed with oxalic acid?—Not in all cases.

10416. Do you mix it with anything else?—It is mixed with other dyes, I believe, to bring out different colours.

10417. Do you mix it with chromic acid?—No.

10418. Is your experience the same, Mr. Clarke?—(Mr. Clarke.) We have not had any cases in our factory. We sent out a number of circulars to the doctors, and one question we asked was whether they had had any experience of chrysoidine poisoning. Out of eighteen replies, twelve had no knowledge whatever. One or two said that they had come across one or two cases of ulceration of the skin caused by using chrysoidine. I have also made one or two further inquiries, and I believe there have been in Leicester two or three cases which could be directly attributed to poisoning from the use of chrysoidine.

10419. Do you think those cases were due to the chrysoidine itself, or to something else with which it was mixed?—Probably to something with which it was mixed.

10420. Have you had no cases in your own factory?—In our own factory we have had no cases whatever, and in the reports from manufacturers representing 6,000 people, two only say they have had a case.

10421. Chrysoidine has been used for a very long period throughout the trade, has it?—It has. (Mr. Beale.) I think chrysoidine was used at the time the finishers used to do work at home, and the whole family was engaged in the work, and children would no doubt be very careless with anything of the kind; so that if chrysoidine was such a dangerous poison the cases would have been very numerous during the time the finishers worked in their own homes.

10422. (Mr. Cunynghame.) Why is oxalic acid put with the chrysoidine?—(Mr. Loake.) I think it is to strike the colour.

10423. Would chrysoidine do alone without mixing anything else with it? Is it necessary to mix these other poisonous ingredients?—The men do these things by rule-of-thumb so much that until this matter was brought up we have not found it necessary to investigate it. They make their own dyes in various ways and we have not thought it necessary to trouble about the thing. We have never heard about any disease or illness arising from the use of it.

10424. Would you have any objection to a special rule forbidding the use of poisonous ingredients in dyes?—I do not think we should, but I am afraid I cannot answer that fully. (Mr. Beale.) I might say that at the present time there are a lot of paints used in the trade. Where chrysoidine itself is used, a natural finish is required. What we call a natural finish is, that after the boot is completed the grain of the leather must be raised.

10425. In brown boots do you put something over the whole of them to dye them?—Generally.

10426. Saffron used to be used for that purpose, did it not?—Not for the uppers. When the leather comes to us it is already coloured.

10427. But surely you must in your inquiries have heard something about this alleged case of chrysoidine poisoning, must you not?—(Mr. Clarke.) Until I investigated it at Leicester—and I have only come across two or three cases—I had never heard of it. (Mr. Loake.) Our doctors have never heard of it.

10428. A doctor told us that he had investigated it and there certainly was something in it, and he attributed it not to the chrysoidine but to the deleterious material used in it. That was a Bristol doctor?—(Mr. Beale.) There is not a case of poisoning from chrysoidine known at Northampton according to the report of the Medical Officer of Health. (Mr. Clarke.) The use of chrysoidine is decreasing in Leicester every year.

10429. (Dr. Legge.) Is oxalic acid used in any other way in the boot trade than mixed with chrysoidine?—(Mr. Loake.) Not that I know of.

10430. Are bi-chromates of potash or soda used at all to get yellow dyes?—I have not heard of it.

10431. Is chromate of lead not used to get the yellow stain?—Not to my knowledge. We buy so many of these preparations ready made from people who prepare them ready mixed, that we do not know the composition of them all. (Mr. Beale.) I think you will find that Epsom salts is used more than anything else in connection with our trade in Northampton. (Mr. Loake.) Our federation have never had any cases of poisoning of any kind brought under its notice previous to this circular.

10432. It is an eczema of the hands and forearms; it is not internal?—I mean even of that we have never heard anything.

10433. If it were scheduled I do not think it would be at all a serious matter, would it?—(Mr. Beale.) Is it very serious in its effects?

10434. Apparently now and then a case takes a month or two to get completely well, but the generality of the cases are not serious?—During that time can the man follow his employment?

10435. No?—(Mr. Loake.) The only danger about scheduling a thing of that kind is that people might be ill from other causes and attribute it to a cause which is not the real one. (Mr. Clarke.) If it were scheduled the component parts of the chrysoidine should be described.

10436. (Chairman.) Is there anything further you wish to add?—(Mr. Beale.) I should like to say with regard to Mr. Clarke's remarks that I hope the committee will bear in mind that it will be a very serious thing for the operatives in the boot trade if the question of phthisis is pushed. Again, for instance, a man might apply to you for a situation and he might have an outbreak on his arm, which he might say was caused by using these dyes, and if there is the least thing the matter with him in all probability he would not be employed, which will add to the unemployed again.

10437. (Dr. Legge.) The late Dr. Dryland, in his report as Medical Officer of Health, some years ago, referred to several cases of nervous breakdown—neurasthenia—amongst the bootmakers of Kettering, due, it was believed, to the vibration of the heavy machinery that was introduced into the boot trade. Do you know anything about it?—(Mr. Loake.) I was not aware of it. I have been on the Urban Council and was on the Urban Council during the time he was medical officer, but I never heard of it, though I do not deny it.

10438. (Chairman.) When you say you do not deny it, do you mean you do not deny that it was in the report?—I mean that I do not deny it was in the report, but nervous breakdowns arise from many causes. I think they are far more prevalent amongst the commercial travellers and business men than amongst operatives.

10439. (Dr. Legge.) Is it not the fact that in the old times heavy machinery was introduced into factories where the foundations were not strong enough, causing more vibration, whereas now that cause of complaint has disappeared owing to the better foundations?—Yes, that is so. Everyone now aims at getting a solid base for the machinery. Beforehand it used to be put upstairs in places which were never intended for it, but all that is altered now.

THIRTY-SEVENTH DAY.

Monday, 22nd April 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. FITZMAURICE, C.M.G., called and examined.

10440. (*Chairman*.) You are the Chief Engineer to the London County Council, I believe?—Yes.

10441. And the staff connected with the main drainage of London is under your control?—That is so.

10442. It has been represented to this Committee that men who are engaged in this work suffer from various diseases arising from their occupation, and it has been said that they occasionally contract typhoid fever; that they may get erysipelas, and some other diseases that may result from contamination. What is your experience on that point?—I have prepared a number of tables giving you all the cases of illness we have had, and I have prepared also an abstract giving the cases of illness from diseases which appear to be most prevalent; I do not think typhoid is a disease that we are troubled with at all.

10443. How many have you altogether in your employ?—920.

10444. The table shows that of enteric fever you had no case in 1903, one case in 1904, no case in 1905, and one in 1906?—Yes.

10445. Of typhoid fever one in 1903, none in 1904, 1905, or 1906?—Yes, that is so.

10446. Do your Medical Officer's returns show the cases of erysipelas?—Yes, they do. I have a complete table here. I cannot give any opinion on the medical question, but can only give you the actual facts as I find them, and I thought perhaps it would be better to give a table showing every case of illness which has occurred for a certain period. The other tables are simply more or less abstracted from the large table. I may not have abstracted the cases in the way you want them.

10447. You have no separate head of erysipelas in the abstract?—No, I have not.

10448. I noticed, in glancing through the table, there was a case on the first page; but that was a case of a piermaster?—Yes.

10449. Would he be subject to infection?—No; I think in his case there would not be the least chance of infection.

10450. He would not be liable to contract the disease from his employment, you think?—No.

10451. In the next few pages I do not see any case of erysipelas?—I do not think you will find many cases at all.

10452. In your opinion, there is no trade disease amongst the men in the employ of your department?—I do not think so. The principal diseases we find the men suffer from are catarrh and different varieties of bad colds. I think there is a certain amount of reason for that amongst the men who work in the sewers especially, because in the winter time the temperature in the sewers is a little bit higher than the outside temperature; and in the summer it is a little lower; so that there is a change of temperature when they come in or out. I do not know whether that causes the colds. I should think it might possibly; but it is a very small thing. As a matter of fact, without going into statistics at all in the matter, we have as a general rule considered that these men are exceptionally healthy.

10453. Is that because you only employ exceptionally healthy men?—We have them all examined before they are put on the permanent staff.

10454. But if men engaged in the work were specially liable to typhoid fever, for example, the preliminary healthiness of a man would be no protection?—Of course not; and I do not think really the work aids any diseases; otherwise my attention would have been drawn to it long ago.

10455. And it never has been?—Never.

10456. There is no sub-division of your department which you think is specially unhealthy, is there?—No.

10457. (*Mr. Cunyngame*.) What is the average number of men among whom the absences through sickness other than accidents occur?—You will find all that information on Table No. 2.

10458. Do I understand that the proportion of days absent to the total working days does not work out in any case to 2 per cent.?—No, it does not.

10459. Could you give any general figure by which you could compare that with the number of days' absence of other employees under the London County Council?—No, I do not think I could do that; I might try and get the information for you.

10460. It is possible it might be in the possession of some of the departments, is it not?—Yes. The Main Drainage is by a long way the largest department, except the Tramways Department. If you would care to have the figure for the Tramways Department, I could get them.

10461. I should rather like to know what the figure for the Tramways Department works out at. It would be very instructive for many reasons if we could get those figures.—I will try and get them for you.

10462. (*Dr. Legge*.) Have you had any investigation made of the bacteria present in the air of the sewers?—No, we have not.

10463. It has been done for the London County Council, has it not?—It has been done, I think somebody at his own request made the analysis for his own information, and I dare say we could get it.

10464. You do not know whether there were any pathogenic organisms found in the air?—I should not like to say. I have a list of deaths which occurred during this period also, and the causes of death in each case. But I personally do not attach very much importance to any results which could be obtained from that table of deaths, for the following reasons. The men who were employed in the time of the old Metropolitan Board of Works get pensions if they are permanently incapacitated; men who came since that time do not get pensions, but they contribute towards a fund, and the Council makes a similar contribution; and if they are incapacitated by illness, they get the two contributions. Consequently, if a man is incapacitated, he gets under the one scheme a pension and under the other a lump sum and goes, and we cannot trace him. We had practically eliminated the men who were seriously ill before the age of 65 before the table was prepared, so that it very much diminishes any value which might attach to it.

Mr.
Fitzmaurice.
C.M.G.

22 April 1907

Mr. Fitzmaurice
C.M.G.
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10465. (*Chairman.*) But that would only apply to diseases which are fatal after an interval. If you had men who died from enteric fever, for example, you would know of those cases, and they would be included, I suppose?—They would be included if they

were in our employ when they contracted the disease; and the tables include all cases of that kind. I only want to point out that too much importance should not be attached to the table. Those deaths given there include the deaths of all the men at work.

MR. ROBERT JOHN COLLIE, M.D., called and examined.

Mr. R. J. Collie, M.D.

(*Chairman.*) Are you Medical Examiner to the London County Council?—Yes. I have prepared a short statement of opinions I have formed from a study of Mr. Fitzmaurice's statistics on "The Sickness of Working Staff, Main Drainage Branch." My experience of main drainage men is confined to the preliminary examination of men entering the service, and their examination every twenty-eighth day should they remain on the sick list so long. It will be seen that in practically all the tables there is a striking similarity in all the figures of the four years mentioned, therefore for practical purposes any one year is typical.

10466. (*Professor Allbutt.*) Was there not rather a large amount of pneumonia in one year?—I did not notice it. The impression I have formed from the small number of times I have been called upon to see the men, from a careful study of the tables now before the Committee, and from interviews I have had with the two District Medical Officers who attend the sick night-soil men at the Thames Outfalls, is that they are a remarkably healthy class of men. During the four years covered by the tables there have been only twenty-two deaths from disease, and the causes of death as stated do not indicate the prevalence of any particular disease. It is remarkable that in a staff of 920 men working with the sewage of the Metropolis there have been, in a period extending over four years, only three cases of typhoid fever. I have been unable to trace two, but the District Medical Officer who reported the third, states emphatically that it was produced by an insanitary condition in the man's own house. Typhoid fever is essentially a disease of adolescent life. Drainage men who work in the sewers and sludge vessels (where contagion might reasonably be expected) are men of middle life, many of them between fifty and sixty years of age. They are specially selected, and are all exceptionally strong and healthy. The sludge men at all times, and the sewer men when above ground, live in the comparatively bracing atmosphere of the Northern and Southern Outfalls at Crossness and Barking. Further, there is reason to believe (although the exact cause is not yet ascertained) that the specific organism which produces typhoid fever, is more or less absent from the sewage at the Northern and Southern Outfalls, and it is not unreasonable to assume that the enormous numbers of pathogenic organisms which find their way into the sewage prey upon, and annihilate each other. The District Medical Officers who live in the neighbourhood of the Northern and Southern Outfalls (where the sewage enters the river) inform me that the families of the men who work in the Main Drainage Department are by no means below the average in health. In order that I might fully appreciate the conditions under which these men work, and assist the Committee, I took occasion recently to visit the works and thoroughly investigate the conditions which obtain. I satisfied myself that there is nothing which renders the workmen specially prone to disease. I have examined Table 4, where the diseases from which these men suffered are enumerated, and agree that it embraces the most frequently recurring diseases. The Medical Officer of the Southern Outfall is of opinion that there is no disease in Table 5 which he can say is specially attributable to the work the men are engaged in. On the other hand, the Medical Officer of the Northern Outfall states that he believes the tonsillitis is of a septic nature, and that the men are liable to attacks of gastric catarrh, characterised by sudden nausea and sickness, and that this is directly associated with certain obscure conditions of the air of the sewers. In this connection, however, I would point out that gastric catarrh is a very frequent result of errors of diet, and of excessive use of alcohol. While one Medical Officer says he sees a large number of these cases, the other, who attends the men who work under exactly similar circumstances on the opposite bank of the river, says he sees but few cases, and attributes them to the causes which I have mentioned. Further, it is to be remembered that most of

these men are members of sick clubs, and that they draw sick pay even if ill only for a few days, and receive half-pay from the Council while off duty. The diseases under the heading, "lumbago, rheumatism, and sciatica," I look upon as being of common origin, and are no doubt indirectly the effect of the conditions under which most labouring men have to work. I am not prepared to deny that the hard work and consequent perspiration of men who work in the sewers, and the bleak, exposed position of their work when they come above ground, does not make them somewhat more liable to the undefined condition known as rheumatism. These conditions are, however, in my opinion, not sufficiently marked to call for special treatment by the State.

10467. (*Mr. Cunynghame.*) Do I gather from your comments on the tables which have been given us by Mr. Fitzmaurice that a very small percentage of days seems to be lost by these men in the course of the year through sickness?—That is so.

10468. It varies from one to one-and-a-half days in the year, which strikes me as being remarkably small?—Yes, it is very small.

10469. As far as I can see from the figures there does not seem to be the slightest case for including this in any schedule of diseases at all?—That is my impression. With regard to the point raised about pneumonia, which year did you refer to?

10470. (*Professor Allbutt.*) I do not draw attention to it as being a very marked feature; I think work of this kind, involving change from the sewer air into the fresh cold air at the outfall, and also perhaps some degree of intemperance amongst the men, would quite explain all the pneumonia you have; but I think in 1903 there were four cases of pneumonia?—Yes.

10471. But in the subsequent years it was only one case?—Yes; it is possible that may have been on account of the epidemic of influenza. With this exception one year is typical of another.

10472. (*Dr. Legge.*) Do you know of any investigations made as to the bacterial contents of sewer air?—Dr. Andrewes, of St. Bartholomew's, examined the London County Council sewers, and he seemed to come to the conclusion that any bacteria in them came from the outside through the gratings, and that they were not the result of what was there.

10473. Germs are not given off from the liquid contents of the sewer?—That was the result of his investigations. I believe he somewhat modified it later, but I know he formed that opinion.

10474. Did he investigate, for instance, the splashing in the sewers?—I do not know.

10475. The sludge is all moist, I suppose?—Yes, you would get moisture from it, because they push it with a squeegee, and when a bubble bursts they would get splashes.

10476. Do you think what you have said as to the water-carriage system of sewage removal holds good also as regards the health of the men in other methods of the disposal of night-soil, such as the tub system and pail system?—I have no knowledge; but I should say it would not. For instance, if you have a typhoid germ in a dry-earth closet (except for the disinfection of the earth for the time being) it would not have the chance of destruction from the other pathogenic germs in the sewers. But I have no special knowledge on the point.

10477. Do you have to examine for the London County Council other men besides night soil men?—I have to examine them all—every one.

10478. The Sanitary Inspectors?—Yes.

10479. Has your attention been called to any particular illness amongst the employees arising out of employment?—No.

10480. The Sanitary Inspectors at the London County Council would not be engaged in the work of disinfection.

ion in houses, would they, after fevers and so on?—No, only in the special departments they look after. If in any of the night shelters, for instance, ever broke out, these men would disinfect the house. They do not do what the Borough Council men do, except in the particular houses under their care—and here are few.

10481. Have you had cases of definite infectious illness induced by such work, smallpox, for in-

Mr. A. J. ATKINSON, called and examined.

10483. (*Mr. Cunynghame.*) What are your qualifications?—I am an analytical chemist practising in Cardiff, and I am a Fellow of the Institute of Chemistry.

10484. I believe you wish to state to the Committee something about calcined spathic ore?—It is my business to sample many samples of iron ore for some of the steelmaking companies of South Wales, and the calcined spathic ore is now making some advances in import. Formerly, up to about four or five years ago, we used to have nothing but natural ores; but the supply of natural ores in Bilbao has become more scarce, so we have had to fall back on the use of calcined spathic ore.

10485. What is spathic ore?—Calcined spathic ore is the carbonate of iron which has been burned in order to drive off the carbonic acid. One or two cargoes have been found to be excessively dusty, and the last we had of that nature was on the "España," to which the attention of Dr. Legge was called, and which no doubt he remembers. As the result of that visit of Dr. Legge, the steel makers of South Wales are beginning to fear that the Committee might decide to include the discharging of these spathic ores among injurious trades, and if all the cargoes were such as that of the "España," I do not suppose they would raise any objection; but they wish to guard against the Committee assuming that all the cargoes are of the same nature as that of the "España." During the last three years a company for whom I act regularly have had some 120 cargoes of calcined spathic ore, most of them from Bilbao; and I went through our books the other day to see how many of these cargoes had been objected to by the workmen as being injurious. I found that of the 120 cargoes outside those from Passages and Almeria there were only three objected to. Those from Passages and Almeria have been objected to to such an extent that the workers have been granted a much larger rate for discharging, the result being that the manufacturers are trying to limit the importation; in fact they have practically to exclude the importation of these ores now.

10486. (*Dr. Legge.*) Is that a calcined spathic ore?—Yes; but it has not long been brought here.

10487. But it is probably going somewhere else?—I do not know how that may be. I do not know that there have been any objections to these cargoes in any port except Newport. I asked the Cardiff manager of Guest, Keen and Nettlefolds, Limited, whether they had any trouble about it, and he said, "No." A little while ago, when there was a movement in favour of increasing the rate for discharging calcined spathic ore in Cardiff, the men made some complaint, but there has been no specific instance; and as a matter of fact the movement for increasing the price for discharging was not successful. The evidence that the Steel Makers' Association wish me to give is with regard to the point that cargoes, such as those of the "España" and the "Rapido" are quite exceptional, the bulk of them being perfectly harmless with very little dust; and what dust there is does not cause the abrasions on the skin.

10488. (*Mr. Cunynghame.*) In what respect is the dust of these two cargoes exceptional? Considering it from a physical point of view, what is the difference between these cargoes and the ordinary ones?—The difference between these cargoes and ordinary cargoes is that in this dust there is a larger proportion of caustic lime. In the carbonate of iron there is a certain amount of carbonate of lime, in some cases more, in some cases less; and when it is all put into the kiln the carbonate of iron and the carbonate of lime are both calcined and we get caustic lime, and the dust from that lime causes the sores on the men's arms and faces. They perspire in the hold, and the

stance?—No. But it is only fair to say that I have been Medical Officer for the County Council only for a comparatively short time, and it is only recently that I have examined employees periodically every 28 days, so that my experience does not extend over a very long time.

10482. In any other capacity have you examined officials of the District Councils?—No; but I certainly never heard of their being specially liable to infection.

moisture slakes the lime dust as it drops on their skin and so burns them.

10489. Is there a possibility of putting on anything to prevent that, such as oil or grease?—That has not occurred to me. It might be possible, but I do not think the men suffer so much as to desire anything like that.

10490. As to the effects of what they suffer from, have you seen cases of it yourself and seen where the arms and exposed parts have been sore?—Yes—in the case of the two cargoes I have referred to I have seen the sores on their arms.

10491. What were the symptoms you saw?—A little irritation of the skin.

10492. Was the skin taken off?—A little bit.

10493. Did it look like a very bad case of chapping?—Except that the sores were circular instead of straight.

10494. There was a redness, was there?—Yes, it was more like an eruption.

10495. How long did it incapacitate the men?—Not many days.

10496. Did it actually incapacitate them?—No. I do not know that they were incapacitated from work. They complained while they were working that these places were sore; but I do not know of any case where a man was actually incapacitated.

10497. What wages do they get on an average per day for that work?—They are paid tonnage work.

10498. What were they making per day?—I am afraid I cannot say; because the amount they earn per day depends so much on how they are able to work. Sometimes they are delayed for want of wagons.

10499. What is the wage that a man at that sort of work will sometimes make on the maximum?—From £1 to 30s. a day, I should think.

10500. But he does not make that the whole year round, does he?—No, there are long spells perhaps of three or four days or a week at a time when no vessel comes in, especially at Newport. At Cardiff the work is more regular, because it is all concentrated in one dock.

10501. Then, perhaps it is rather difficult to say how long a man has been absent from work on account of suffering? He might be off work because no other ship was coming in?—I think there would be no difficulty as to that. The men are in regular gangs at the different depots or wharves where they discharge this ore, and it would be easy enough to find out if any man was off work on account of these sores. I am not the employer of these men, so that I am afraid I cannot answer the question, though I have not known them off work on that account.

10502. (*Dr. Legge.*) Have you noticed, or had brought to your notice, any effects inside the mouth or in the nose or throat?—I have heard that the men spit blood on account of this.

10503. It must have the same effect on the lining inside the mouth, producing ulceration, as it has on the skin?—I have no doubt it has some inflammatory effect on the mucous membrane of the mouth and nose.

10504. Do you think that is due to the lime?—Yes, but it is rather a strange thing that these two kinds of ore from Passages and Almeria I have specially mentioned, contained also manganese, and I do not know why the manganese should be a greater irritant than the lime only, but it seems that it was so.

10505. Occasionally men have to lie up, do they not, because of the effects of their work?—I do not know whether it has ever gone so far as that.

10506. There are a number of other industries

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which the Committee have to consider. Seeing that it is not very serious incapacity the men suffer from, but that it is clearly due to their work, have you any objection to eczema or eruptions produced by dust being included under the Workmen's Compensation Act, which would cover not only this particular eczema amongst calcined spathic ore workers, but also others, and leave it to the workman to prove that it was due to his employment?—The difficulty about that, as far as I understand the matter, is with regard to the insurance. We have the same men employed for working the ordinary non-injurious calcined spathic ore and for working these one or two odd cargoes of dusty spathic ore, and it seems to me the employers of these men would have to insure themselves; and I do not quite see how the insurance companies would be able to separate the risk of one or two odd cargoes from the general amount of ore that comes in.

10507. These men are employed and paid, are they not, by the dock authorities?—There are differences. The men you saw on board the "España" are paid by the dock authorities, but the men of the Ebbw Vale Company are paid by the Ebbw Vale Company, and in Cardiff the men are paid in one case by Guest, Keen, and Nettlefolds, and in other cases by a contractor, so that the thing is rather complicated.

10508. But you could lay before the insurance companies the facts you have mentioned as to the rarity of incapacitating illness amongst them, which would convince them as to the smallness of the premiums required, I suppose?—That is true, of course; but as in some cases the Dock Companies employ the men, they would simply insure and charge a higher rate for discharging all kinds of calcined spathic ore.

10509. Leaving calcined spathic ore, do you ever have trouble in the unloading of such cargoes as calamine?—Yes, I have had one or two cases at Swansea, and in one cargo the injury to the men was very much greater than with calcined spathic iron ore.

10510. Was it very much of the same nature?—Somewhat.

10511. The eruption on the skin, and perhaps ulceration inside the nose and mouth?—Yes.

10512. Would that be produced in the same way by the presence of lime?—I fancy that was due to the carbonate of zinc itself.

10513. Is it calcined?—No, it is a natural mineral. It is very dry and dusty.

10513*. If such illness as that occurred, it would be covered in the same way by "eczema or ulceration of the mucous membrane produced by dust," would it not?—That is so.

10514. And seeing that it is rarely that the illness incapacitates, the burden would not be great, would it?—The burden might be great actually.

Mr. THOMAS OLIVER, M.A., M.D., F.R.C.P., LL.D., called and examined.

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LL.D.

10526. (Chairman.) You have received, I think, from the Secretary to the Committee a list of the diseases and injuries, not being accidents, which the Committee have investigated?—I have a list here.

10527. Have you noticed any omissions from that list of cases of industrial disease which might properly be made the subject of workmen's compensation?—Has the Committee considered the question of sulphuretted hydrogen?

10528. The Committee have had some evidence with regard to sulphuretted hydrogen in chemical work. Do you mean cases of sudden poisoning?—Yes.

10529. That would be accident within the meaning of the Act. The workmen would be able to claim, if it were a sudden accident, but if a man were gradually poisoned by working week after week in an atmosphere tainted by this gas it would be a matter for the Committee to investigate. Are there any other cases which occur to you?—There is laundry work, and the question of eczema in the workers.

10530. We have considered the question of eczema generally?—Then there is the question of laundry workers catching smallpox by washing the clothes of a deceased person. Would that come under the Act as it is now, and should not this be brought before the attention of the Committee? It becomes much like anthrax, an accident.

10515. I should have thought it was hardly worth troubling the insurance company about it. Although there is no doubt it occurs, it occurs so very rarely, that it might not be worth while to trouble insurance companies about it, and that you could deal with it yourselves?—Possibly. I do not know that I intended to say anything about insurance, but that is what occurs to me, that it would cause difficulty with regard to insurance. The chief point I wish to emphasise is the fact that it is so rare, and that it is hardly worth while to complicate the business by the inclusion of this in the noxious industries.

10516. In the unloading of mundic or arsenical ores, do you know of any ill effects?—I do not. I have no experience of that, but I can conceive there would be. Speaking of arsenic, I think, when you were on board the "España" you asked me something about the constituents of this dust, and whether there was any arsenic in it, and I was not able to tell you except in a general way that we did not find arsenic in the Bilbao ores, but we do in the Mediterranean ores. I examined this particular cargo to see if there was any arsenic, and I found there was none.

10517. With regard to lead ores, do they come into Newport?—No.

10518. Have you had experience of them in such work as you do?—I have. I have had, perhaps, the dustiest lead ore which comes in, which interferes with the men considerably. I have had cargoes of litharge at Swansea, and there has always been trouble with the men with that.

10519. Do you know that lead poisoning is already included in the Workmen's Compensation Act?—Yes.

10520. In the unloading of ordinary lead ores you could not get lead poisoning, could you?—Unless the dust found its way into open wounds. These men might have open wounds which might be poisoned by the introduction of lead dust.

10521. Do you see much of the unloading of grain cargoes?—Not very much. Of course, they are unloaded in Cardiff; but I have never heard of any injuries from the dust arising from the grain.

10522. Does copper precipitate produce any effect on the workmen?—Undoubtedly it does.

10523. In what way?—In much the same way, the irritation of the mucous membrane, spitting of blood, and irritation of the eyes. I have seen that at Port Talbot, where copper ores come in, and the men complained there very seriously.

10524. Have they complained of chest troubles at all as the result of inhalation?—They are very indefinite, and I am afraid I could not tell you.

10525. What struck you is the effect on the skin and the effect on the mucous membrane of the nose?—Yes, the skin chiefly.

10531. Would you give me a list of other omissions which you think should be investigated?—The same thing would apply to persons working in slaughter-houses, killing cattle. About two years ago we had in the North, at a colliery a few miles from Newcastle, some of the ponies in a pit ill from infectious disease, and two or three of the men died from acute pneumonia, not unlike the pneumonia of anthrax. Would a case like that come under the head of industrial diseases?

10532. Not unless it was scheduled?—Then there is the question of electricity and electric welding, which I do not think is mentioned.

10533. What diseases arise there?—Burns and sudden death, especially in the former.

10534. They are accidents, you see?—There is, too, the effect on the eyesight.

10535. That the Committee have heard something about?—Then there is the question of dermatosis. I have a note here with regard to school teachers catching illnesses from defective drains in school, and illnesses during an epidemic by children coming to the school; I think that is a matter which should be considered, also the question of house surgeons to infirmaries and nurses to infirmaries. I see you have dealt with hernia.

10536. (Professor Allbutt.) Supposing a sudden rup-

ture at a certain known moment, that in a healthy man would be an accident, would it not?—Yes. Until now it has never been regarded as an accident.

10537. In the vast majority of cases, however, it would be slowly established, would it not?—Yes, one can put one's finger upon certain cases where a rupture has occurred at a particular time, and that would be now regarded, I take it, as an accident.

10538. (*Chairman.*) Let me take one by one the points you have raised. There is first the question of gradual poisoning by sulphuretted hydrogen. In what employment does that occur?—That might occur in sewer work by men coming out with headaches and dizziness. I include with this other gases—e.g., the gassing of men in streets where they might be mending pipes.

10539. Would the latter be a case of sudden poisoning or gradual?—It might be either. You might have a patient ill for some time from the effects of the gas poisoning. In some cases this has been established.

10540. Which you think is due to poisoning from sulphuretted hydrogen?—No, that is coal-gas poisoning; but I put them all together, and class them under work done in confined places, such as a sewer, or where men work at pipes in a street or a tunnel.

10541. Would these illnesses incapacitate for more than a week?—Yes, some might leave more permanent effects. For example, I have seen in coal-gas poisoning an illness last a few weeks.

10542. Are those cases of sudden gassing?—I hardly know what to call sudden. A man is quite well when he goes to his work, he is exposed to the gas, and perhaps during the day he is taken ill. I would call that comparatively speaking sudden.

10543. Would it be due to a leaky pipe?—Yes, or to turning up of the soil saturated with gas.

10544. What other gases cause these effects besides sulphuretted hydrogen and coal gas?—Carbon monoxide, of course, would give about the same kind of symptoms as gas.

10545. (*Mr. Cunynghame.*) The slow effects that may follow a thing that is sudden poisoning could be compensated under the provision as to sudden poisoning. Taking, for instance, something wrong with the plant in a gas works, if there was a case of sudden seizure by gas poisoning it would come under an accident, would it not?—That is the view the Committee take, I understand.

10546. (*Chairman.*) The only cases the Committee are dealing with are those which are not accidents in this respect, that the effects are not produced suddenly or in an hour or so, but by a slow, insidious process?—Of course, if a man is exposed repeatedly to poison for some days or months in his occupation, and he becomes gradually saturated with the poison, I take it that would be a chronic case of poisoning. In such a patient you would probably get structural changes which might be permanent.

10547. Is that so in the case of sulphuretted hydrogen? I have been struck with the fact that most of the effects produced by this gas are sudden effects. We have very little evidence of the gradual effects of these gases. For instance, taking carbon monoxide, while it is plain it may overcome a man suddenly, I do not think we have any strong evidence, if I remember right, as to gradual poisoning. Have you any experience of gradual poisoning by carbon monoxide? Can you name any cases?—I cannot name any cases of what you could call protracted poisoning; the symptoms are generally acute.

10548. I mean cases that, though they were monoxide poisoning, could not be treated as accidents, or would accident cover the ground?—You have men, for instance, exposed at blast furnace works to carbon monoxide gas. Those men may suddenly be seized, others may work for some little time, then go home, they cannot take their food, they have a headache, they go back to work next day, and are again exposed to the gas; but there comes a time when they are not able to go back to work.

10549. Can you trace that to carbon monoxide itself? Is it known it is carbon monoxide?—In the cases I referred to the gasses were analysed, and large percentages of carbon monoxide were found.

10550. What cases do you refer to?—I am referring

to two cases that were sent to me from the neighbourhood of Stockton-on-Tees.

10551. Recently?—About eighteen months or two years ago. In the case of these patients there have been left unmistakable changes in the nervous system, whereby they are quite unfitted for work, and I take it that is rather the outcome of gradual poisoning. I think on the whole, that, from the point of view of recovery, one would rather deal with an acute case of poisoning, and get the thing over, than with slow poisoning.

10552. (*Mr. Cunynghame.*) Is there a sufficient number of these cases of chronic and gradual carbon monoxide poisoning to warrant you in saying, if you were writing a book on industrial diseases, it was an industrial disease?—Yes, I think so.

10553. Do you, in your book on industrial diseases, mention these as industrial diseases?—I do not think I do, speaking off-hand, but these cases occurred since that book was published.

10554. (*Dr. Legge.*) You have referred to it in your recent article in Rolleston and Allbutt's "System of Medicine"?—I do not remember the particular place. There are two types of poisoning, the acute and the sub-acute, and as you can get either from bi-sulphide of carbon, I do not see why, with a gas like carbon monoxide, you should not get the same effects. I do not think there are many cases of slowly produced carbon monoxide poisoning.

10555. Would we be right in saying that it was a very rare thing?—Very rare.

10556. And there one must leave it. You know of two cases that you believe to be cases of that kind?—Yes, there are the two cases that came under my own observation.

10557. Can you say in those two cases you are absolutely certain, or was it surmise only?—I am quite certain, because an analysis of the gases and the symptoms pointed to carbon monoxide poisoning.

10558. Did you examine the blood?—They were long past the acute stage when I saw them. Carbon monoxide is gradually eliminated from the blood and no traces are left, but while that is the case where the blood is concerned, it is not the case so far as the nervous system is concerned.

10559. (*Chairman.*) What other gases are there which cause the same symptoms?—You might go on to the gassing in mines, I think, after that—by carbon monoxide after colliery explosions, and the gases liberated in the firing of explosives in mines and quarries.

10560. I am referring to chronic poisoning. You said that carbon monoxide was one form of chronic poisoning; I understand you to say sulphuretted hydrogen was another?—Possibly another, but less likely to be chronic than the other. At any rate we are not so familiar with it.

10561. Have you come across any cases?—No, not chronic cases of sulphuretted hydrogen poisoning.

10562. And coal gas?—Yes, coal gas amongst workmen.

10563. Have you come across any cases of that?—I have had under my care one or two cases amongst men who have been poisoned whilst mending pipes in the street.

10564. Have they been gradually poisoned, or has it been a sudden gassing?—In some instances rapid. My difficulty about the use of the term sudden is this: In the case of a man who has been working say a few hours, going home and becoming sick a few hours afterwards—would you call that sudden?

10565. It would depend upon circumstances. If a man was working on a plant in a chemical works, and there was a breakage in some part of that plant, and the man working at it had been there some hours and was taken ill, that, I should say, would be an accident; but if the atmosphere in which he was working was the ordinary atmosphere of the place, and there were no special circumstances to constitute it an accident, then I should be inclined to say it was a case of disease?—But suppose to-day he had been exposed to that leak, and only had a headache, and went home and vomited, and the next day perhaps was unable to go to work, would you regard that as an accident?

10566. Of course it would be for a Court to interpret the meaning of the word accident, but from decisions

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Mr T Oliver that have been given I should be inclined to say that that was an accident?—Quite so.

F.R.C.P., LL.D.,
22 April 1907 10567. (*Mr. Cunynghame.*) One must not confuse the two things, the first is the cause and the effect comes afterwards?—Quite so.

10568. (*Chairman.*) A man might cut his hand slightly and feel no effects and not even go home, but perhaps later it might develop into some bad disease, yet it would be an accident nevertheless?—That is so; then these cases would be sudden poisoning.

10569. You do not find men working constantly in an atmosphere charged to a slight extent with some deleterious gas which in the long run causes them to be taken ill—apart from carbon mon-oxide? I am speaking now of sulphuretted hydrogen and coal gas?—There I am afraid my answer would be a purely theoretical one. There is no reason why they should not. I think it is possible.

10570. (*Dr. Legge.*) With regard to the two cases you described as having been sent to you by Dr. Stephenson, are you aware that those men were not gassed so as to be unconscious at their work?—Yes.

10571. On the other hand they may have inhaled gas day after day; their appearances became altered, and then they had finally to go off work without any unconsciousness having supervened?—Yes, coming, therefore, under the type of chronic poisoning.

10572. (*Chairman.*) Were these two men employed at the same works?—Yes.

10573. And at the same processes?—Yes.

10574. (*Dr. Legge.*) Do you know if there were any other cases?—I do not remember; I think not.

10575. Apart from the question of cases like those, do you recognise sequelae in acute cases of poisoning from C.O. where there has been unconsciousness, which may develop perhaps a week or a month later. Take, for instance, dementia following the inhalation of carbonic oxide, that might lead to difficulty if it were not scheduled as a disease, might it not?—It would. That would come under the sudden condition, would it not?

10576. But it might be very difficult to prove that dementia occurring a month after the unconsciousness was the result of the accident if it were not put down as a disease with definite sequelae?—Yes, I think you must have a distinct connection shown between the two things.

10577. (*Chairman.*) The next point you mentioned was eczema in laundries; to what is that due?—I remember when sitting on the Dangerous Trades Committee, Mr. Morris drew attention to the fact that in London there was a very large percentage of women who attended one of the Metropolitan Skin Hospitals suffering from eczema and cracked hands as the result of the strong alkalis which were used for washing and, I presume, bleaching purposes.

10578. Have you come across any case of that kind in your own experience?—I have not seen any serious form of washerwoman's eczema.

10579. (*Professor Allbutt.*) Do you think there would be many among out patients at the hospital?—No, we have not much of it in Newcastle. It was Mr. Morris who drew our attention to it and spoke most forcibly about it. He said it was a most painful condition of things, and that these women were unable to earn their living in consequence.

10580. (*Chairman.*) Do you know precisely what chemical it is that causes this ailment?—I do not, unless it is the soda. I do not know what the composition of bleaching powder is—chloride of lime, probably.

10581. (*Mr. Cunynghame.*) Upon that would you present that case at present as a sufficiently well recognised one to be included in the schedule?—Not from my own knowledge. If you had time to look up the report of the Dangerous Trades Committee you might find the subject mentioned there.

10582. (*Dr. Legge.*) It would be exactly the same eczema as you get in dye works; the erosions of the skin from the use of strong caustic solutions, I suppose?—Yes. One does not know really how far to call it eczema or simply a painful cracking of the skin.

10583. (*Chairman.*) It would be a dermatitis, would it?—Undoubtedly, but of a painful character, and rendering the patient unfit for work.

10584. Then infection amongst laundresses from

linen belonging to persons who have been suffering from disease is analogous to the question, is it not, of compensation to nurses?—Yes.

10585. Should you say that a laundress who contracts smallpox through washing infected linen got ill through an accident?—Yes.

10586. In that case the question would be outside the purview of this Committee, because it would be already included in the Act. As to diseases contracted by slaughterers in their occupation, what have you in mind?—If a man striking a bullock on the head, and in some way or other the blow missed, that would be an accident. Suppose in handling the hides of an infected animal he got blood-poisoning, that would be an accident, too, I take it, and that would be provided for. That was my idea in mentioning the matter.

10587. Then you mentioned disease contracted from ponies in a pit, which had been brought to your notice recently. What were the men suffering from?—One of them at least died from pneumonia.

10588. Do you think it was a case of glanders?—We tried to get the micro-organism, but we failed; but I still think it was a disease contracted from animals.

10589. If it were not glanders, what do you think it could have been?—I do not know what else it could have been.

10590. Were both the men employed in the same pit?—Yes, I believe they were.

10591. And subject to the same infection?—And subject to the same infection. The disease was so bad in the pit, that I believe they had to destroy 30 or 40 ponies. The only way they got rid of the disease was by killing all the suspected animals.

10592. Was any other theory advanced by anyone besides glanders?—No. What struck me and the veterinary surgeon who gave us the diagnosis was the relationship of the two; the men looking after these animals becoming ill and dying from an illness that was not pure pneumonia for there were large glandular swellings.

10593. (*Professor Allbutt.*) When you speak of the tests for the glanders bacillus, are you speaking of it as being applied to the animals as well as to the men, or only to the men?—I did not see the ponies; I do not know what tests the veterinary surgeons employed. We tried the blood of one of the men but found nothing.

10594. (*Chairman.*) If the Committee were to schedule glanders as one of the diseases under the Act that is all we could do in such a case as that, is it not?—You do it with anthrax now, so that it is already provided for; but I think in doing so you confine it to particular trades, such as the wool trade.

10595. No, that is in regard to putting the burden of proof on the employer?—In the cases I have referred to there is direct contact from the animal to man in a place where, perhaps, no one expected to find it, viz., a coal mine.

10596. My point is this: Suppose glanders as a disease were added to the schedule, then the men could have claimed for glanders; in any other event they could have claimed for nothing?—Is it wise to simply call it glanders? I do not know what other infectious disease horses may suffer from. There must be others.

10597. That is what we are asking you?—I know, but I cannot give you any name for the diseases in question, because the blood showed nothing definite.

10598. Were the ponies suffering from glanders?—From a disease akin to glanders. Several of the horses died and others had to be killed. I do not know whether Dr. Legge could suggest any other name than glanders.

10599. The next point you mentioned was injury to the eyesight, due to electric welding. What form does that injury take?—It affects the eyesight the same as a bright electric light.

10600. Does it incapacitate men from working?—Yes, it might set up inflammation.

10601. Have you had any cases of it, to your knowledge?—No, but there have been cases in Newcastle.

10602. Is it easy to connect the injury to the eyesight with the process?—Yes, I think so.

10603. Do you know whether there have been many

cases?—I should think about Sheffield there have been probably more than in our neighbourhood.

10604. Is not it the case that the men engaged in those processes are very careful to wear glasses, which would prevent their suffering?—Yes, and where it is done there is very little likelihood of the eye affliction alluded to taking place.

10605. Have you ever heard or known of a case in which it has occurred where the men were wearing protectors?—No.

10606 (*Professor Allbutt.*) To the best of your knowledge, can they work with the same advantage with glasses on?—I think so.

10607 (*Dr. Legge.*) What particular part of the eye is affected?—Neuro-retinitis.

10608. Does that usually end in recovery, or have you known cases of permanent optic atrophy?—I cannot call to mind any permanent case of optic atrophy, only blindness for some time.

10609-10. It would be akin to tobacco amblyopia, would it?—Hardly.

10611. (*Chairman.*) As to the effect of electricity on the skin, what injury is caused?—You may have dermatitis; and where electricity is used in manufacture for bringing about the decomposition of certain solutions you sometimes get dermatitis.

10612. Is it due to the electricity, or is it due to the solution?—Probably to both. The electricity itself may cause burns on the skin; the nascent conditions created in the solution probably may have some effect.

10613. Do you have many cases of dermatitis from electricity where no solutions that might themselves cause the injury, are present? Is it possible to isolate the electricity as the cause of the dermatitis from the solutions?—I think so, because one sees tremendous burns following the use of electricity; it is therefore a question of degree.

10614. The burns would be accidents, would they not?—So would these minor forms of injury, I consider.

10615. Then is it your view that the workers suffer from a series of small burns from electricity which facilitates dermatitis being caused by the solutions?—It is rather difficult to put it in those words, I think.

10616. (*Professor Allbutt.*) We know, I think, the effect upon the hands of workers with using X Rays. If not protected, they suffer serious injury to the skin. That would be an instance of pure electric action on the hands, would it not?—Yes, that is the kind of thing I mean: there is an acute inflammatory affection of the skin, not necessarily such a destruction of the skin as to cause a sore.

10617. (*Chairman.*) Does it cause incapacity amongst workpeople and prevent them working?—For a time I should think it would.

10618. Have you had any cases under your own observation?—No; I have only had experience of the bad effects from burning by electricity.

10619. You have had no experience of the dermatitis?—No.

10620. Where have these cases occurred?—I cannot tell you exactly.

10621. They are not mentioned in your book on Dangerous Trades are they?—No, I do not think they are, but it is common in France; in many of the chemical factories there it occurs, where electricity is used to break up solutions, and the men suffer from very severe forms of dermatitis.

10622. Would you expect it to occur in our chemical centres, such as St. Helens and Widnes?—I do not think they use the processes there.

10623. Do you know anywhere else in England where they are used?—No, I do not.

10624. (*Mr. Cunynghame.*) Do you know anything about electro-platers?—No. I have only casually seen the men working.

10625. (*Dr. Legge.*) Do you include the effect of the Röntgen Rays under this heading of electricity; do you regard it as a dermatitis?—You get the best illustration, perhaps, from that.

10626. There is a considerable increasing industry

now, is there not, in connection with it?—That I have no experience of.

10627. I have read about what you speak of as occurring in France, but I have no knowledge of it in this country?—Quite so.

10628. (*Chairman.*) With reference to the question of rupture of the valve of the heart, do you know of any cases where that might occur not at a given moment, but as the result of more or less continuous employment?—Yes. Professor Allbutt was one of the first in this country to draw attention to the fact of the development of such a disease as the result of prolonged strain. What was in my mind was rather acute rupture.

10629. That, of course, would be an accident, would it not?—That would be an accident under this Act. I have seen a few cases of acute rupture of the aortic valve in men who had been lifting a load rather suddenly, or carrying a heavy weight, and at the post-mortem examination only one segment of the valve has been found to be ruptured and the other segment is healthy. That was the acute rupture of the aortic valve to which I referred.

10630. (*Professor Allbutt.*) The difficulty is, is it not, in applying it in particular instances?—Yes. I do not think it can be regarded as more than presumably an acute rupture, and therefore traumatic, unless you have complete evidence that previous to the accident the man's heart was known to be quite healthy.

10631. (*Chairman.*) With reference to the question of naphtha poisoning in indiarubber works, there is a reference in your book on Dangerous Trades, in an article I think from your own pen, to malaise and anemia, and so on, caused by naphtha poisoning: Have you any knowledge of persons being incapacitated from work for more than a week by being so affected in indiarubber factories?—No, not from naphtha, but the inconvenience caused by it is very great in some instances.

10632. That is a question of ventilation, is it not?—Ventilation, and I suppose predisposition and idiosyncrasy in some people.

10633. But you do not find them incapacitated from work for a week or more and then going back to their employment?—No.

10634. Therefore, it could not be a subject for compensation under this Act, because compensation is only payable when the workman is incapacitated?—I have not seen cases which would last more than a day or two.

10635. Have you ever, in your experience, come across any case of anthracosis in which the disease was clearly due to irritation of the lungs by coal dust?—Might I ask whether you intend to go beyond coal?

10636. Not in this question?—Yes, but not within recent years.

10637. When?—Twenty years ago we saw miners' phthisis occasionally.

10638. Among coal miners?—Yes, among coal miners.

10639. Were they miners who were working in clean seams of coal, or coal which required the excavation of rock in order to be able to get it?—At this distance of time one could scarcely answer that question except from a knowledge of the coal strata that were being worked then and now. The Northumberland coal is a hard coal, and therefore does contain a good deal of stony grit, and it was presumably the grit and not the coal that was the cause of the phthisis; but with improvement in ventilation in the Northumberland pits anthracosis has practically disappeared from Newcastle.

10640. You say "practically." Have you come across any cases in recent years?—Yes, we get now and again a post-mortem examination upon an old miner whose lungs are quite anthracosed, but not in young miners.

10641. With regard to fibrosis generally we have had so very much expert medical evidence that perhaps it is only necessary for me to put to you the result of it, which is that if the history of the case is known, and the man's employment and other elements are known, it is possible for an expert to distinguish during life fibrous from tubercular phthisis. Do you agree with that?—If the fibrosis is unaccompanied with tubercular affection possibly.

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Mr. T. Oliver, 10642. Do you think if the fibrosis is known to have existed for some time and tuberculosis supervenes the disease should be taken out of the category of fibrous cases and put into the tuberculous?—Not necessarily.

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10643. From the point of view of workmen's compensation, if it were proved that the man had had fibrosis for some time, and that the fibrosis was due to his employment, it might be right to require the employer to pay compensation, even though the man ultimately died through the supervention of tuberculosis?—Yes, but that is a subject I think upon which you will have to be extremely careful. There would be great risk in regarding many of these cases as fibrosis when they are really not fibrotic at all. To begin with, you would have to know something of the character of the strata in which the man was working, something of his antecedents and previous illnesses.

10644. I was not thinking so much of coal miners' phthisis as of ganister miners' phthisis, potters' phthisis, stonemasons' phthisis, and grinders' phthisis?—There you are dealing with dusty trades that undoubtedly do cause fibrosis of the lungs—the same with tin mining and the gold mining of the Transvaal. There you have the true causes, but I do not think you have them in coal as coal.

10645. In those other trades do you think it would be possible for an expert medical man, knowing the history of a case, to say: "This is a case of lung disease due to the employment"?—I think he could to a very great extent, because the illness is quite different.

10646. A man may be suffering for some years from preliminary symptoms before it can be definitely said his disease is fibrosis, I suppose?—Yes.

10647. Suppose fibrosis of the lungs were made a subject for workmen's compensation, have you considered what would be the position of the work-people who suffered from those preliminary symptoms? Supposing an employer was obliged to pay his workman compensation if he got fibrosis, and has in his employ one or two men who suffer each winter from bronchitis, which may or may not develop into fibrosis, do you consider there is a real danger that such men would lose their employment and at the same time not be able to claim compensation because the fibrosis had not yet become patent?—Yes. I do not think you could absolutely make the diagnosis of fibrosis during the early stages at all; it might be suspected.

10648. And you might feel sure that the illness might develop later into fibrosis, I suppose?—If you knew the history and the atmosphere in which the man was working.

10649. But there would probably be many men now employed in ganister mines, or as stonemasons, or in other trades, who each winter have attacks more or less severe of bronchitis which might develop in the course of time into fibrosis, but which, on the other hand, might not; do you think it possible to say in the case of those men whether it will develop into fibrosis or not?—It is not possible.

10650. Therefore, it would be impossible for them to claim compensation for fibrosis, or its preliminary symptoms?—I think so.

10651. On the other hand, the employer would know if it did develop into fibrosis he would be liable to pay compensation if the Home Secretary schedules it?—Yes.

10652. In those circumstances, do you think it would be to the interest of the work people to schedule fibrosis; do you think they would gain more or lose more?—In North Country mining districts, away from the ganister mines, it would be no gain to them at all.

10653. I am considering the trades which I have mentioned—ganister mining, tin mining, grinding, and stonemasons' and potters' work. What do you say, the point being the wholesale dismissal of suspected men?—That is a very serious question to give an answer to, because there are so many things leading up to bronchitis. I do not think you can deal with it just in that general way. The fibrosis of the lungs in a gold miner is typically developed and is quite a different thing from what the ordinary practitioner sees amongst miners generally. It is not the same thing at all, and there is very little bronchitis accompanying it. The symptoms are so different, the man is short of breath, he has sometimes no physical signs, and one is struck with the great disparity between the absence of physical signs or the comparative fewness of the physical

signs and the amount of difficulty in breathing and distress.

10654. Still there is a stage, is there not, in the development of the disease when its symptoms are not characteristic?—In the early stages particularly.

10655. That is the stage in which possible danger to the workmen may be not a physical danger, but an economic danger of losing his employment for fear, on the part of the employer, of his being made a charge upon him for the rest of his life for compensation for fibrosis. Have you considered, speaking as you do with great expert authority on the question of industrial diseases, whether it would be more in the interests of the working classes in those trades which are likely to develop fibrosis to schedule this disease or not to schedule it?—I do not know how to reply to that question on the spur of the moment. It is a very difficult problem, and requires careful consideration. If you took men away from their work at that particular stage, I do not know that you would have any guarantee that you would check the fibrosis—the thing may be deeper than the bronchitis would lead you to infer, and the damage may be already well on the way. It may have been inflicted and you would have the changes following. It would be a hardship, I think, in many instances, to simply dismiss a person because he has bronchitis, and yet, on the other hand, there is no doubt that bronchitis is one of the first conditions noticed, not necessarily with expectoration, because it is not accompanied by expectoration sometimes at all. I really could not say which would be the better thing to do for these people, whether to schedule it or not. You will have a great many people thrown out of employment, and what are they to do, because so many trades are dusty.

10656. (*Dr. Legge.*) Assuming that the disease was to be scheduled, do you think it would be right to exclude from the employer's responsibility all the cases of phthisis that occurred within the reasonable time that fibrosis usually takes to develop—say fifteen years?—But fibrosis does not take fifteen years to develop.

10657. I am leaving out of question tin miners. In tin miners and Transvaal miners it is quickest of all, but with the stonemason, the Sheffield grinder, and the ganister miner it is certainly not less than ten years. Assuming that fibrosis was to be scheduled, would it be fair to exclude all cases of death from phthisis, or incapacitating illness from phthisis, which developed under say ten to fifteen years of employment in the trade?—You see the term "phthisis" is such a big one. There can be included so much under it.

10658. If it were scheduled, would not it be likely that the claims would be made in every case of phthisis that occurred?—I am sure they would, and that is why I hesitate to answer too readily your question. I think it would give rise to a very great deal of litigation. With the tin miner and the gold miner probably there would be no difficulty, and in the ganister miner, too, I take it there may be some difficulty as compared with the tin miner, but the coal miners I would exclude altogether, since in them fibrosis can scarcely be said to occur.

10659. Would you exclude the stonemason?—One knows that stonemasons' phthisis is well named. The name itself conveys the belief we have about it and its relation to the trade, yet while the individual is working in the open air he gets the disease.

10660. The employer is responsible for the fibrosis, but he is not responsible for the tubercle bacillus, which is the cause of death or incapacity, is he?—That is so. Some of these cases of fibrosis are fibrotic from beginning to end, and not tuberculous.

10661. That I admit; but in the majority of cases in the stone mason and in the grinder it is the tubercle bacillus grafted on to the fibrosis which kills, and consequently the employer is not so much responsible for the tubercle bacillus and the fatal or incapacitating results?—No, only you are going to make him responsible for dust conditions in other trades, in which tubercle may be associated with the dust.

10662. If you are going to include the supervention of tubercle bacillus amongst his responsibilities, ought not you to relieve him of something at the other end?—If you have already made him responsible for the fibrosis, it does not matter whether the tubercle supervenes or not—you have made him responsible, and it is the fibrosis that comes first.

10663. (*Chairman.*) If a man contracts fibrosis in his trade, and after the lung has been injured the tubercle bacillus finds a nidus, and ultimately kills the man, is it possible to say whether the man died of fibrosis or tuberculosis? In that particular case could anyone say?—Yes, I think you might, because the illness was, up to a certain stage, purely fibrotic, and it then takes on a distinctly tuberculous character. You can suspect the transformation of the one to the other.

10664. As being the cause of death?—There are the two diseases co-existing. It is not always easy to say how much is due to the one, and how much to the other.

10665. That is what I ask. Can anyone say which disease the man died of, or which disease was responsible for his death?—I think one would go the length of saying, in the case of a disease which was grafted on to another that up to that time had only been slowly impairing life, that when the patient became rapidly worse and emaciated quickly death would be probably due to tubercular disease.

10666. Do you think people who have fibrosis are more liable to contract tuberculosis than other people?—No, not necessarily. It does not offer easier access to the tubercle bacillus; but that is only my opinion.

10667. (*Professor Allbutt.*) I do not think it makes any very great practical difference in the particular case whether a man has the tubercle or not at the later stages?—Quite so, he goes down much the same.

10668. (*Mr. Cunynghame.*) And a post-mortem examination, in spite of the tubercle, would show the fibrosis, and even the dust probably?—Yes, you would find the dust in the lung.

10669. (*Professor Allbutt.*) Do you think it makes any great practical difference in the evolution of the case whether in later stages an accession of tubercle had taken place?—Nothing more than that it hastens death.

10670. (*Chairman.*) There is another point I should like to put in connection with fibrosis. Do you consider that slate dust is a cause of it?—Yes, in France particularly so, not so much in this country.

10671. Do you think that slate particles are a lung irritant?—Yes.

10672. Less irritating, however, than ganister particles, should you say?—I do not think there is really much difference between the two.

10673. Do you think whatever is said with regard to fibrosis due to ganister should be said also with regard to fibrosis due to slate?—I think so.

10674. But coal dust, on the other hand, is much less of an irritant, is it?—Yes, and the more so the freer from stony particles—soft coal is wonderfully free from risk.

10675. I should like to ask you whether you are of opinion that cataract is a trade disease in the case of oottle finishers?—I think it is over-rated. They do get it, but not to the extent we have been led to infer.

10676. We had some figures from the Yorkshire Bottle-Makers' Trade Union that, out of 114 cases of men on their superannuation fund, 33 came on to the fund owing to cataract, and a number of others, 13 or 14 owing to other eye diseases. Should you consider that a large percentage?—It is a larger percentage than I was aware of, and after that information, if supplied from medical sources, I should certainly say it ought to be scheduled.

10677. If those figures are representative of the incidence of the disease, you think it should be scheduled. In any given case of cataract would it be possible to say whether or not the disease was due to the industry?—I think it probably would if you knew how the men worked at the furnace. It is generally said that it occurs in the eye which is nearer the furnace.

10678. But cataract exists amongst all classes of the population, does it not? Anyone might suffer from it who has not the remotest connection with bottle making?—Quite so.

10679. There is a certain percentage of persons in the general population who suffer from cataract, and the same percentage one would expect to find amongst bottle makers. Is it fair to ask the employers to compensate all the bottle makers who suffer from cataract

when a certain percentage would have suffered anyhow?—But you do that as regards all the other trades.

10680. No, because there is always a distinctive symptom. There is nothing scheduled which cannot in the particular case be distinguished as being due to the trade?—That is a point on which I should like to have the opinion of a man like Mr. Snell and other oculists.

10681. The oculists' evidence is a little bit contradictory. Dr. Robinson was of opinion that the symptoms shown were different from those of ordinary cataract, while Mr. Snell took the opposite view?—I have no opinion upon that question that would be of any assistance to you.

10682. There is another question I should like to ask you. Have you come across cases of sprained wrist among miners, due to causes other than accident, due to prolonged working in hard coal?—It does occur. You are not referring now to beat hand, but to a sprain itself?

10683. Yes, a sprain or strain?—Yes, it does occur, but I have no experience of it. I know that it is complained of.

10684. (*Mr. Cunynghame.*) You instanced a school teacher getting an illness from a defective drain at a school. With regard to that, would you call that a disease; it is a disease due to the employment, is it not?—Yes.

10685. But it is not a disease due to the "nature of the employment," which are the words of the Act, is it?—It has nothing to do with teaching.

10686. The words are "disease due to the nature of the employment." The nature of the employment is teaching, is it not?—Yes, but I thought the words were "in or during the course of the employment."

10687. (*Chairman.*) Those are the words that govern cases of accident?—Fever would be an accident occurring in the course of, but not due to the nature of, the employment.

10688. (*Dr. Legge.*) Do you consider that dust, apart from creating fibrosis, can develop simple chronic bronchitis?—Yes, undoubtedly.

10689. In your opinion, is there the same claim to schedule chronic bronchitis as there is to schedule fibrosis? Is it possible to distinguish chronic bronchitis due to dust from chronic bronchitis the result of other causes?—I think, in the case of bronchitis due to dust, the probability is that the patient would expectorate a great deal of dust in his sputum, whereas in ordinary bronchitis there would be nothing like that.

10690. Would you make that the test?—I do not see what other test really you have, unless it be an intimate knowledge of the occupation.

10691. In what industry does it occur?—You have it in flour milling and slag crushing, and trades of that particular type—dusty trades.

10692. Have you seen basic slag pneumonia?—I have seen the lungs of a patient who died from pneumonia during the Middlesbrough epidemic, and which was thought to be due to basic slag work. I have only seen bronchitis in slag workers and not pneumonia.

10693. (*Chairman.*) If a person working in a dusty trade got bronchitis, not from the trade, but as anyone else might do, would you find dust in the sputum?—Yes.

10694. Therefore, in that particular case, you might be misled if you said the bronchitis was due to the trade?—You might.

10695. He might have got bronchitis just as his brother living in the same house might get it, due to susceptibility and exposure to draughts or cold?—Yes. I do not think the latter would have so much of the dust; it is a question of degree. I do not know of any other test that you could apply except examination of the sputum. Each form might tend to become chronic and be unattended by rise of temperature.

10696. And that might be misleading?—It might be, but I think that is the only test you could apply with the history of the patient.

10697. I suppose in Newcastle there are a number of people who suffer from bronchitis from time to time, as in every other town?—Yes, we have our share.

10698. And there are a number of people in New-

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Mr. T. Oliver, castle, are there not, who are employed in dusty trades?—Yes.

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10699. If you saw a man in hospital suffering from a bad attack of bronchitis, and knew that he was engaged in a dusty trade, could you undertake to say, "This man's disease is due to his employment, and if he claims in the county court I am prepared to say it is due to his trade"?—Personally I should hesitate.

10700. In the great majority of cases it would be too uncertain to enable anyone to say?—I think so, and it would lead to any amount of deceit and litigation. I would not suggest bronchitis being scheduled, as I think it would be a most difficult thing to deal with.

10701. (*Professor Allbutt.*) Do you consider that from the point of view of medical diagnosis the existence of fibrosis of the lungs due to dust is sufficiently definite to be placed in the schedule as an industrial disease?—No, not in the early stages, certainly.

10702. But supposing a man has got to a stage of incapacity?—There, again, we are met with the question of what is incapacity, because some who have the illness go on working, others give in and would probably give in if they knew there was a chance of compensation; it would, no doubt, be a very great boon to people if they did give up their work and received compensation, for, although it might not altogether check the extension of the disease, these persons would certainly live longer if they could get into other employment. But I do not think you can always diagnose fibrosis in the earliest stage. Both lungs ultimately become affected.

10703. I was inquiring as to positive incapacity?—It is the shortness of breath which incapacitates, and yet there may be very few physical signs. In the deep mines in the Transvaal the mining authorities do not attach much importance to dust as the cause of fibrosis; they rather regard a good deal of the incapacity as the result of gassing; others, again, as the result of pulmonary conditions consequent upon coming suddenly from the depths of the mine, which is hot, to the cool surface and the great change of temperature. The pulmonary condition is not considered by them fibrosis, but the medical men do consider it fibrosis. I have always regarded it as fibrosis.

10704. You disagree with them and think they are wrong?—Yes, but I must say I think if fibrosis of the lung is scheduled you will have very great difficulty; it will give rise to a great amount of litigation and fraud, and medical men are not all able to distinguish the one form of lung disease from the other; and even at a post-mortem examination, if there is the slightest excess of fibrous thickening, which, for example, might be due to syphilis, they might succeed in getting the compensation, though it would not be right. Is the Committee dealing with caisson disease, for I see this is included in the list the Secretary was good enough to send me?

10705. (*Chairman.*) We are quite clear on that. I suppose you have no negative evidence to give us?—No, except that I do not know on what lines you are going. I mean that the causes of the malady are not quite clear. Decompression is certainly a cause of the illness, but it is not the sole cause in every instance.

10706. If we were to schedule such a term as this: "Compressed air illness and its sequelae," and give compensation to persons working in compressed air, would not it cover it?—Yes.

10707. It would include any worker employed in compressed air, and the illness comes from the compression of the air, does it not?—Compression slowly induced does not cause any symptom. Then, might I ask in regard to pitch cancer and coal oil, we had, as you probably know, two or three cases, one of which was taken to the county court—a man who had to have his arm removed above the elbow for cancer, due to manipulating coal oil in what they call grease making. There is not the least doubt that the frequent exposure to the hot oil sets up first a series of warts and then sometimes ulceration. These ulcers heal or do not heal—some may and others do not; ultimately the thing may break out, and you have a large ulcer, which goes down to the bone and is microscopically proved to be cancer.

10708. What oil is it?—Creosote oil—coal oil and

tar preparations. You will remember some time ago, no doubt, when I wrote certain articles for your "System of Medicine," Professor Allbutt, you drew my attention to arsenic as applied to the skin. I examined this coal oil for arsenic, but there was no arsenic in it, so that the cancer was not due to arsenic.

10709. (*Dr. Legge.*) By coal oil, do you mean petroleum?—No, it is a crude oil.

10710. Do you think it would be included, for instance, in such a heading as "epitheliomatous cancer or ulceration of the skin produced by pitch"?—Would pitch be a sufficiently wide term, do you think?

10711. Do you think one ought to add "or tar"?—I think that pitch alone would not cover it.

10712. On the other hand, to leave it simply to such words as "epitheliomatous cancer or ulceration of the skin" would be too wide; you would have to define something which gave rise to the condition, would you not?—I should think "certain tar products" would do.

10713. (*Chairman.*) What are the products used for?—I think they are used for lubrication purposes. I have seen three cases in one of which a man lost his arm. In giving his verdict against the claimant for the loss of his arm, the Judge made the remark, "Had this case come before me a month or two later when the Act had come into force, the man would have got compensation," but it was ruled not to be an accident in the ordinary sense of the word.

10714. There is another small matter. In your book there is a reference to a complaint called "Stamp lickers' tongue." Is that a form of ulceration of the tongue?—Yes.

10715. And it also extends to the palate, does it not?—Yes.

10716. To what is that attributable?—I think it is due to an abrasion of the skin, and poisonous matter or chemicals on the stamps.

10717. Have you known cases occur recently?—No, I think the malady was cleared out after the Dangerous Trades Committee dealt with it.

10718. In your opinion, it does not exist now?—I do not think it calls for any special mention, although it might. Most of the factories got mechanical lickers after that. They saw at once it was a nasty process.

10719. And so far as you are aware, the disease has disappeared, has it?—I think so.

10720. Do you know what particular chemical it was due to?—No, it might, of course, be due to the gum being prepared with unhealthy water, or it might be due to dye off the label itself.

10721. Did it incapacitate workers from being employed for a period of a week or more?—Yes, but they were all young girls. Some developed large glands in consequence of it.

10722. And it incapacitated them?—Yes, I think some would be off probably for weeks, but I had not the opportunity of following up the cases.

10723. (*Dr. Legge.*) What you are saying rather points to the necessity of scheduling some such words as "ulceration of the skin and mucous membrane produced by chemical action," does it not?—Yes, as you put it, I think it would be a very good thing.

10724. Some comprehensive term for these eczemas and ulcerations of the mouth would be advisable?—Yes.

10725. Do you recognise poisoning from nitrous fumes which would not be regarded as an accident even although the symptoms usually come on 24 hours afterwards; they are so definitely traceable, are they not, as a rule?—I think one must do so.

10726. Have you any special industry in your mind?—Not so much an industry as the effects of a chemical fire, where the men who were putting out the fire ultimately died from acute inflammation of the lung of a very peculiar character consequent upon the nitrous fumes.

10727. The Committee have had a good deal of evidence on that point. In all cases it could be referred back to a definite exposure to the fumes, and in that way would come, would it not, under the heading of an accident?—Yes.

10728. In your book you refer to nitrous fume poi-

soning in the manufacture of celluloid, and you refer to a death from pneumonia or acute bronchitis. Was that a gradual poisoning or was it a definite exposure to fumes?—I cannot recall the case you speak of.

10729. Your attention has not been specially directed to it?—No.

10730. Therefore nitrous fumes can be regarded, can they, in the light of an accident?—Yes.

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M.A., M.D.,
F.R.C.P.,
LL.D.

22 April 1907.

THIRTY-EIGHTH DAY.

Tuesday, 23rd April 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).

Mr. HENRY CUNYNGHAME, C.B.

Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. J. J. CANDLISH, called and examined.

10732. (*Chairman*.) Are you member of the firm of Robert Candlish and Son, bottle manufacturers, Seaham Harbour, near Sunderland?—Yes.

10733. How many hands do you employ?—About 600.

10734. How many of those would be bottle finishers?—I have prepared a statement as to the number of those men who come in contact with the furnace. I have not the number of finishers, but I should say 60 or 70 would be employed absolutely in finishing.

10735. How many cases of cataract have you had in your works?—We have never had any case of cataract which has compelled a man to leave his work, but I have made inquiry in the works and I find there are five men now employed there who say they have had cataract; one is aged 73, a man named A.; B., aged 67; C., aged 62; D., aged 60; and E., aged 56.

10736. Are these men still at work?—They are still at work. A. had an operation performed at the age of 67; B. at the age of 65; C. at 60; and both D. and E. were aged 54.

10737. Are there any other men in the works who suffer from any other affection of the eyes?—We have inquired of every man who has been employed more than 30 years at the work, and of that number, about 50, there are only three who say their eyesight is indifferent. One is named George F., aged 65; and his brother, aged 63; and a man called G., who is also 63. With regard to the two F., I know the family are short-sighted. I put in a list of the 50 men with the answers they have given me, their ages, the time they have been at work, and what they say about their eyesight.

10738. Do you say you never had a case of men having to leave their work through cataract, or other affection of the eyes?—I do not remember a single case where a man has had to leave his employment.

10739. How many years does that statement cover?—It represents inquiries of the men who have been with us since the works commenced, 54 years ago, and my personal experience extends over 37 years. You will observe in that list that one man is over 70 years of age, and is still at work; he has been employed at bottle works for 66 years; ten of them are over 60 years of age, 18 are over 50 years of age, and 17 are over 40 years of age; and as far as I can learn, the remaining 400 men who come in contact with the furnaces and are employed in the works, all have good eyesight.

10740. What occupations do the five men who have had cataract follow?—B. has worked at the trade for 58 years; he was a bottle maker, but not a finisher. He went away from the bottle making and was in the coal pits for about ten years, and came back, and

after being back with us a few years he had an operation for cataract. But he was then 65 years of age, and if his eyesight was injured, it is more likely that it was done in the coal mine. The other man, D., No. 9 on the list, is now labouring. He ceased to be employed as a bottle maker some years ago. He says he has had two operations for cataract, but he is a man who was never what we call a steady workman. He did not take care of himself, and any injury to his eyes I should think was certainly not caused by his work.

10741. He was previously a bottle maker?—Yes, he was an apprenticed bottle maker.

10742. And after serving his time did he become a regular bottle maker?—Yes; then he went to sea, and was for many years a fireman on some colliers that go to Seaham; then he came back to the bottle works and worked for a while again.

10743. For about how long after he went to sea, do you happen to know?—I do not. He went backwards and forwards a good deal; but he settled down when he got older. He says he started at the bottle works when he was seven years old. You see he was an old man before he had anything the matter with his sight. Then No. 15, A., is 73 years of age, and he is still working. He ceased making bottles six years ago.

10744. Why did he stop?—Age, I think. His eyesight was not good, and since then he has had an operation for cataract. C. is now labouring. Two years ago, when he was aged 60, he had an operation.

10745. And he is now labouring instead of bottle finishing?—Yes; he has not been a bottle hand for a great number of years. He never was a finisher; he was a gatherer, and then he became a glass maker, which, if anything, is more trying than bottle making, as far as the light of the furnace goes. A bottle-maker works at a small hole, which we call the working hole, and is not much exposed to the glare. He simply dips his tool into the metal and takes the bottle behind a shade. But a glass maker has to be continually watching the glass melting the whole time, and therefore is much more exposed than the bottle makers. Those men are provided with blue glasses, but they very seldom use them; they can see better without them, they say. They are not spectacles, but a piece of square blue glass in a frame, which they are supposed to take up when they are looking into the furnace, but they prefer not to do it. E. is 56 years of age, and has undergone an operation for cataract, and says his eyesight is all right now. He never was a finisher; he is a blower, which is the work, I understand, which is the least likely to do injury to the eyesight, because the man's back is always to the furnace.

10746. What does your medical officer say on the

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subject?—I wrote to the medical officer and he replied: "In reply to your question as to my experience of industrial diseases in the bottle making trade, with special reference to cataract, I beg to state that I have attended your employees for 23 years, and during that time I have not seen a case of cataract or of any other disease of the eyes which was in my opinion due to the patient's employment. I consider that, on the whole, bottle making is a healthy occupation.—Yours truly, Gerald Dillon." He is the Medical Officer of Health for the district.

10747. Then in your opinion do I gather that there is no industrial disease, and you consider that bottle making is a healthy trade?—I do.

10748. I have before me a list of cases sent to us by the men's Trade Union—the Glass Bottle Makers of Yorkshire Trade Protection Society, showing that out of 114 men who are on their superannuation fund, 33 have come on it for cataract, and 15 others for other diseases of the eye, making 48 out of 114. Can you offer any explanation of that very large proportion?—It is a very small proportion of the members of the Society, is it not?

10749. It is nearly half of those superannuated?—Which shows how healthy the trade is. Out of a Society which has, you say, 4,000 members, there are only 114 on their permanent fund, which covers years. I think that figure of 114 is the return for 10 years, from 1897 to 1906. If you take the 33 for cataract, that only gives you about three men each year, and it only gives 4.8 for all eye diseases for 4,000 people, so it is only 1 in 1,000.

10750. It is one in a thousand if you had a different 1,000 every year?—You see, it is a growing Society, and the membership a few years ago was only 3,000; while it is apparently 4,000 now.

10751. In this list of cases furnished to the Committee, I do not see any cases from Seaham Harbour. There is one case in London, and one or two at Newport, South Wales?—Quite so.

10752. (Mr. Cunynghame.) The point is this. You see what the men say here is, that, out of 114 cases of general illness, you get no less than 48 cataract and other diseases of the eye. Now, if you examine the returns of other societies, of course, you would find various diseases, but you would not find such an enormous proportion of cataract?—But would you not find a very much larger proportion of the men on the superannuation fund.

10753. That depends upon the conditions under which they are put on the fund?—And the age they are put on.

10754. Why is it that out of 114 cases you get such a very large number of cataract cases, though the total may be small? That is the point, and it wants explanation?—I think the proportion of men that go on the superannuation fund is very small compared with other trades; but of those that do go on they must go on for some reason; and when a man is too old to work, all he has to do is to get a doctor's certificate that his eyesight is failing him, which is the most likely thing he can get. The bottle-maker is not exposed to weather; he works in a comfortable room; he has the furnace behind him, certainly, but he always works in a cool atmosphere. It is a regular and healthy occupation. He comes at a regular hour, and leaves at a regular hour; he is well paid and well housed, and well clothed, and well fed, and he lives to a great age, and is able to work to a great age, therefore the thing likely to fail him first is his eyesight, but none of them fail until they get to a good age.

10755. Taking the watchmakers' trade, you would expect to find failing eyesight, but you do not see such figures as those with regard to that trade?—I admit that if a man has to go on the superannuation fund, as a bottle-maker, he is as likely to go on for failing eyesight at an advanced age as anything else, but we do not get the young men or middle-aged men with eyesight failing.

10756. (Chairman.) It has been suggested that in some parts of the country men are less likely to contract the disease, because inside the furnace there is a sort of brick erection which takes away some of the glare. Is that the case?—We all have various notions about building furnaces. Some have bridges, and some have not, but I do not think there is anything in it, so far as the eyesight of the men is concerned. I

think in the old days the conditions of working, so far as the eyes are concerned, were very much worse. At present we work with gas tanks. The glass is in a big bath, and it is always much about the same level, melting at one end, and flowing through. In the old days it was made in crucibles, 4 ft. 6 ins. high, and when a man worked at that he commenced working at the top, and as it got lower and lower, he had to stoop further and further over. Therefore I attribute the older men getting cataract to the early experience, if it be proved they can attribute it to the furnace at all.

10757. Do you know the conditions of the work at Castleford?—Yes.

10758. Are they similar to those at other places?—I should say yes, generally speaking, they are similar.

10759. Do you think there are any glass works in England where the conditions are not so good as in yours, which would be more likely to create cataract?—I do not know any works where the conditions need be different. You see, there is a difference in both employers and workmen. Some men are careful, and work like reasonable men. Others care for nothing, and do not take care either of their own bodies or of their employer's property. You always find a different tone in different factories, go where you will, but I don't know of any place where the conditions would create cataract. There are factories, of course, in which men prefer to work to others, because some employers take the view that the more comfortable they can make the men the better and more satisfactory will be the result of the work, and no doubt all round you get a better body of men together like that, and you also get men in a better condition, but in the main I should think there is nothing to complain of in the glass-bottle trade at all, and it is really a healthy trade. Our late manager, retired now, is 80 years of age. He was apprenticed and went through all the branches of the trade. He commenced work when he was 8; he retired 10 years ago, when he was 70, and his eyesight and general health are perfectly good to-day. I consulted him about this, and he said it was "Nowt but a heap o' nonsense."

10760. (Mr. Cunynghame.) Then your view is that this is a sort of remnant, as it were, of an old state of things, and rather old state of ideas?—Yes, that is rather my idea.

10761. Have you any statistics as to cataract amongst the population at large?—No.

10762. I suppose that you would say that some of these figures are dependent upon the old state of things, when, as you tell us, the workmen had to look into the crucible in order to pick the glass out at the bottom, instead of having it brought up to a level?—Yes, I should say, although the proportion of old men who have got bad eyesight is very small, I should think in the future, under present conditions, it will be less, if the furnaces have really injured their sight.

10763. Then we ought to expect from these figures a diminishing number as time goes on?—Yes, if it is the case.

10764. Taking the Yorkshire figures, what would you say?—If you take my own works, and look at the list of names, it bears my idea out. The first man is a storekeeper. He was a finisher all his life until he retired at 50 years of age from the bottle making on account of muscular contraction. Now, a finisher, I understand they say, is more liable to any disease of this kind, and he was a finisher. We have not a man on our superannuation fund for bad eyesight, and never have had but one. Then there was another man, number 2, who was a finisher also, until he retired, aged 69, with good eyes. Number 3 on the list is a gatherer. Number 4 is a man 66 years of age, and for 58 years he has worked at bottle making, and to-day is finishing. I saw him yesterday, and his eyesight is better than mine.

10765. (Chairman.) Then if you have no cases of cataract in your works, you would not have any compensation to pay, would you?—If we had no case in which a man could get a certificate from a doctor that his eyesight was failing him.

10766. But, supposing cataract alone were scheduled?—We never knew that we had accidents in the works until we had the Compensation Act. We know of more accidents in a week now than we had in a year before. I do not suggest they would make

wrong claims, but what I do suggest is that, if men are gathered, when they get to a certain age, to get certificates for damaged eyesight or failing eyesight, it becomes a matter of opinion whether it is due to the furnace or not. If it comes about, these men will not be working at 60 and 70 years of age, but will be on the compensation fund. If you look at the list of men working now, there is not a man under 56 years who says his eyesight is indifferent.

10767. (*Professor Allbutt.*) Have you a large proportion of older hands in your works?—That may be so, the glass-making trade is rather peculiar, because it runs in families, and settles in localities, and smoky manufacturing towns are not so healthy, but I think we are more fortunate than other works, because our works are situated on the sea cliffs, right away from a town.

10768. Would it be true on that account to say that the average age of workmen is higher in the glass trade than in any other trades. If it runs in families and is a steady trade, do you think that is why the age runs higher?—I do not think so. It is a work of a special description. All these compensation funds and so on make it more difficult for us to keep the old men.

10769. The glass makers, on the average, there, are not older than men employed in other trades?—Are not they; I do not know what the average is.

10770. My point is, that cataract being a disease of old age, if glass makers, owing to the conditions of their trade and the hereditary character of it, work longer, the average age of the glass makers would be higher?—Quite so.

10771. And in this case there might be some excess of cataract?—Yes, that would be so.

10772. (*Dr. Legge.*) Is there any limit of age for the men who do finishing?—None.

10773. I understand finishing is one of the hardest departments?—I think it is one of the easiest. There are three main stages, the gatherer who has to take a blow-pipe and gather the right quantity of glass out of the furnace, the blower who blows it into shape, and the finisher who takes it from the blower, runs a piece of glass round the mouth and forms the mouth of the bottle. The finisher sits on a bench, and has to take a piece of glass, weighing about an ounce, run it round, and form it with a tool. He is the highest paid man, because in the old days he had charge of the whole. The bottle is finished when it leaves him, and he has the responsibility of saying whether it is good or bad. He is the highest paid man, and it is considered to be the easiest work. The blower, I should say, has the hardest work.

10774. What would the difference in wages be between this man Johnson, say, who is a storekeeper now and was a finisher?—We simply give the position to an elderly man who is past work; he would probably get 30s. a week.

Mr. W. BREFFIT, called and examined.

10782. (*Chairman.*) Are you the chairman of the Yorkshire Glass Bottle Manufacturers' Association?—I am.

10783. You are good enough to come to the Committee and state something about the alleged undue prevalence of cataract in the eye. Where are your works situated?—About 10 miles from Leeds, at Castleford.

10784. How many men do you employ?—Glass workers, only about 480.

10785. Have you had many cases of cataract among them?—We have had a few cases of failing sight, but whether I should be justified in saying that they were cataract or not I do not know. I do not think I should, because I do not know positively. In two cases I discussed the matter with our doctor, who is a personal friend of mine, some time ago, and I think there is not much doubt that there were two cases of cataract out of the four that I have in my mind, but whether it was in any way due to the trade the men had followed, or whether it was due to old age, or whether it was due to premature old age in consequence of the exhaustive nature of the work, we were unable to conclude.

10786. Do I gather that out of 480 people who were

10775. I think you mentioned one man who had had the lens removed, who was actually doing finishing at the present time, did you not?—Fail is gathering, Coulson is labouring, Cook is labouring, Ward is labouring, and Frater is the only one making bottles, but he is blowing—the second given—the hardest work of the lot. The 50 men given are not a selection; these are the whole of the men I could get hold of at the time. I remembered one or two afterwards who would have made the case stronger. Our masons, for example, are very much exposed, more exposed than bottle makers to this great heat. If anything happens to a furnace that has to be repaired, they have to take out whole blocks of the furnace, and stand so close that their clothes sometimes are singed; and we have a man, a foreman mason, who is over 60 years of age, and who has been at it over thirty years. He certainly has worked for us over 30 years.

10776. But the view rather is that this particular cataract of bottle finishers begins comparatively early—before 50 years; it commences, as often as not, before the age of 50, and not uncommonly at the age of 40?—Is that the opinion of Dr. Robinson, of Sunderland?

10777. Yes?—Well, he has built an eye hospital. Why did not Dr. Robinson come and ask us for evidence?

10778. If there were a limit to the development of the cataract to 50 years, that would relieve you of cataract developing in those who were very old? Dr. Robinson's statement is that this cataract in bottle finishers will probably occur before a man is 50 years old, and therefore if one were to fix a limit after which cataract should not come under the Workmen's Compensation Act, that would, in some measure, meet your difficulty, would it not?—But there is not such a case.

10779. There is not in your works?—Is there any case in Yorkshire of a man who has cataract under 40?

10780. What would your view be if 55 years were fixed on?—But why should you make a rule, or go out of your way to give compensation for a thing which has not been proved to exist? I say my experience is that there is no such thing as an industrial disease of the kind; there is no evidence that can be brought where you have such a large number of men, living under the conditions under which they live in towns like Castleford, where the atmosphere is very smoky and full of chemicals, who are so healthy. I know we are free from those conditions and we have no cases.

10781. (*Chairman.*) Is there anything else you wish to state to the Committee?—I think not. If there is any other information, or you would like me to continue my investigations in our own works or the district, I shall be only too happy to devote any time necessary with a view of eliciting the truth.

employed you have had four cases of injury to the eye?—Four cases that I know of positively.

10787. In how many years?—Twenty years.

10788. Can you tell me the names of those men?—Yes, B.

10789. (*Dr. Legge.*) In what year did he get cataract?—I can hardly tell that from memory; I can furnish full particulars if necessary. I should think it is about six years since he left. Then another man was called D. He has given up, I should think, about the same time—six or seven years.

10790. (*Professor Allbutt.*) These cases were known to be cases of cataract, were they?—I think so. Then there was another man called G., and there was also a man called H. H.'s case, I think, the doctor said was entirely brought on by excessive smoking.

10791. That would not be cataract, I think?—I do not know.

10792. (*Chairman.*) Are yours the only glass works at Castleford?—No, there are two other small factories; one is working now entirely with machines, blowing bottles by machines and not by hand at all.

10793. About how many men would these other two

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factories employ?—I should think about 150 between them.

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10794. The Committee have had furnished them some rather striking figures by the men's Trade Union, by the Glass Bottle Makers of Yorkshire Trade Protection Society, showing a very considerable number of men on their superannuation fund, who have been superannuated owing to cataract. I find, on looking through, the following names from Castleford, L., who was a bottle maker, superannuated in 1899 at the age of 59, the lens of one eye removed for cataract, and there was another cataract in the other eye. He was also suffering from albuminuria. Was he one of your employees?—Yes, I think he was, if it is the man I have in my mind. I remember that case, and I think I persuaded him to be operated upon. I had forgotten about that. Then there is K., of Castleford, a bottle maker, superannuated in 1901 at the age of 50, from early cataract in both eyes?—I do not remember K.

10795. Then there is L., Castleford, superannuated in 1901 at the age of 57, suffering from atheroma of the arteries and early cataract; M., of Castleford, superannuated at the age of 51 in 1901, from cataract in the right eye, and a similar condition of the left eye; N., of Castleford, superannuated in 1901, at the age of 60, with double cataract; O., of Castleford, superannuated in 1903, at the age of 60, from failure of eyesight and chronic rheumatism of the knee joints; P., of Castleford, superannuated at the age of 50 in 1903, from double cataract; Q., of Castleford, superannuated in 1904, at the age of 56, from double cataract; R., in 1904, at the age of 54, cataract removed from the right eye, quarter division, and cataract forming on the left; S., of Castleford, superannuated in 1905, at the age of 59, with double cataract; and T., in 1906, at the age of 62, with early cataract in both eyes. Are any of those men in your employment?—L. was; M. was part of his time, but he left our place 14 or 15 years ago; Q. was at our place. He was a manager, but I had to discharge him for intemperance, and he has left about eight years. T. also worked at our place, but I believe he emigrated to America some time ago. I know nothing about him; he never complained of his sight. I understood he wanted to retire because he wanted to emigrate. He had some boys and girls growing up, and the whole family of them emigrated in a batch.

10796. That is rather a large number from amongst 500 or 600 men employed in one town in one trade, is it not?—You see the number of men employed in the bottle trade is rather diminishing in Castleford. A few years ago there were a great many more hands employed there, and there were a great many men who dropped out in consequence of the failure of two firms there, so that it is hardly fair, I think, to draw an inference of that kind.

10797. How many men would have been employed ten years ago, say in 1898?—I could hardly tell you, but I should say more than there are now.

10798. Were the two firms that dropped out large firms?—Yes.

10799. (Mr. Cunyngname.) The last witness told us that the method of making glass is altering in this respect, that in the old days they took the glass out of crucibles, and had to look into the crucible to gather it from the bottom?—Precisely.

Mr. C. B. F. BORRON, called and examined.

Mr. C. B. F. Borron. 10805. (Chairman.) Are you a bottle manufacturer at Newton-le-Willows, in Lancashire?—Yes.

10806. About how many men do you employ?—About 250 round the furnaces.

10807. Have you had any or many cases of cataract amongst these men?—No.

10808. Have you had any at all?—No, but I have a memorandum of the number in Lancashire itself. I am Honorary Secretary of the Manufacturers' Association of Lancashire, and I can speak with some authority on the inquiries I have made from the other manufacturers. There are about 1,700 in the whole of Lancashire working at the furnaces, and in the whole county there are only four men affected with their eyes. They are No. 1, aged 71, retired. He became a manager in 1883, and cataract developed after he left off practical working at the trade. Then No. 2 retired about the age of 50, from weak eyes, and is now work-

10800. And that the present method is to gather it from the level, which he said was a good deal less likely to injure the eyes. Do you agree with that?—I should say so myself. All these men mentioned here, this man Q., for instance, was a man who never worked at the gas furnace at all. The idea is that the glare or the heat of the modern gas furnace is what is inducing cataract in the eye; but that is absurd, because by far the largest proportion of those annuitants on the Yorkshire Glass Bottle Makers' Society are men who probably never worked at a gas furnace at all. They worked in what we called the pot shops. There were four pots placed together which used to be filled during the night and worked out during the day.

10801. But there was heat round them all the time, was there not?—No, it resolved itself into a coke fire during the working time. There was a big square of about 14 feet, and these pots one at each corner, and the fuel round the pots.

10802. Then you could not stoke during the day, I suppose?—Very little, because it would make smoke, and the men could not work. But in the gas furnace the nearest approach of the flame to the men is 14 feet as a whole. When a man is working he is upright and dipping down, and there is a thick brick wall between him and the furnace.

10803. But not between his eyes and the glass?—It is; really what he sees of the glass is only a very small portion. He gets very little glare and not much heat.

10804. (Dr. Legge.) Were V. and R. finishers?—No. V. was a gatherer, R. was a finisher. G. was also a finisher. Now he was what we call a carboy blower, a man who blew nothing but large bottles of 10 gallons as a rule. That work takes a man away from the furnace considerably. They are not stuck at the furnace in the same way as ordinary bottle makers are. I do not know whether the Committee have taken into account the fact that there are 518 who have left the trade during the last five years, and I think these figures which have been given ought to be taken on the number of men working. It is hardly fair to say there are 114 men retired in nine years or ten years, or five years, or whatever it is, and that those men represent the actual percentage of cases. The only way to get at it, I think, would be to have the whole of the men examined, and I suggest also to the Committee that they should come down and see how these men do actually work, or send a deputation. I should be very pleased to show you anything you like to come and see. There are other matters which might affect the question, and that is the infection of syphilis, the extremely intemperate habits of the men as a rule. I mean the enormous quantities of drink they take, and the possibility that the cataract may be induced in that way. There is medical evidence, I think, to show that cataract may be produced in that way, and there is what is called diabetic cataract, which may be induced by intemperate habits. I have taken a great deal of interest in our men, and tried all I could to persuade them to improve their methods of living, and so on, but it does not have much effect, though I think that there is an improvement to what there was when I first took charge of our business, when my father died, 20 years ago. I am afraid there is more disease due to the causes I have mentioned than to anything else.

ing as a carter in the works where he was formerly employed. No. 3 retired at 60, but is still working in the works; No. 4 retired at 60, and is now 70.

10809. How many years back have you gone in making these inquiries?—This information is obtained from the existing Union lists, and from the Workmen's Association.

10810. What are the centres in Lancashire of the glass bottle trade?—St. Helens and Newton. I should like to put in the Union Secretary's letter to me in which he says: "I find on looking over the list of members who are on our old age pension or superannuation list at the present time that we have only some five members who are suffering, or have suffered, from cataract of the eyes, and this is for the Lancashire District of Glass Bottle Makers, and they are as follows:—No. 1, present age, 71, retired at 71; No. 3, present age 74, retired at 60; No. 4, present age 70,

retired at 60; No. 2, present age 62, retired at 50; and No. 5, present age 72, retired at 58. Now, in my opinion our trade, namely, the glass bottle trade, will compare favourably with a great many other trades; in fact, I think so far as the Lancashire District is concerned may be compared with any trade, so far as my opinion goes, and I have some 40 years myself in the glasshouse, and it is only during the last two or three years that I have had to wear glasses to read with, and I am still working at the furnace every day." That is the information to me by Mr. Robert Hunter, the District Secretary of the Glass Bottle Makers' Trade Protection Society.

10811. Do you know how many cases they have on their superannuation fund?—No.

10812. Do you know at what age men in that Union can claim superannuation benefit?—I think it is 60, but I would not like to commit myself, because they have guarded themselves with regard to the particulars of their organisation, and it is with difficulty you can get any statistics. The letter I have read, you may say, is a friendly letter.

10813. (*Mr. Cunynghame.*) Do your men wear glasses?—No. I may say with reference to that that in the 70's, when our furnaces were so constructed as not to have so much smoke in them, two of our men wore glasses for a short period.

10814. I mean coloured glasses?—I daresay they were coloured. They thought it might ease them, and they did try them, but they did not find them convenient or suitable, and they discarded them.

Mr. W. S. KERR, M.B., C.M., F.R.C.S. called and examined.

10821. (*Chairman.*) Are you in practice at Sheffield?—Yes.

10822. Do you attend here at the request of the Employers' Federation?—Yes, I believe I do.

10823. Can you tell the Committee something about fibrosis of the lungs due to inhalation of dust?—Yes.

10824. Have you had many cases of that under your care?—In the forms of what we call grinder's phthisis I have seen a fair number of cases.

10825. Are you of opinion that fibrosis of the lungs can be differentiated in diagnosis from other lung diseases during life?—No, I do not think so.

10826. If you had the history of a man's employment and were able to examine him over a period of time, do you think that there are never cases in which an experienced doctor would be able to say, "This man's disease is fibrosis"?—I do not think, apart from tubercular phthisis, one could.

10827. You said you had had under your notice cases of grinder's phthisis. What does that signify exactly?—It means that the man has been working in this dust. We take it for granted that he has inhaled dust in his lungs, but what he practically comes for treatment for is tuberculosis.

10828. Have you never had cases in which there is fibrosis without the tubercle bacillus being present?—I have not seen a case myself, but I know of one case at the Royal Infirmary at Sheffield where, with the symptoms of phthisis, there was no tubercle bacillus present.

10829. Is phthisis prevalent amongst the grinders?—Yes, I should say it was, amongst certain kinds of grinders—the dry grinders. One might suspect, of course, if you knew the man's work, and there were catarrhal symptoms, that there was fibrosis.

10830. (*Professor Albutt.*) From what I have seen, and from what I have heard in evidence, I believe that which is, rightly or wrongly, called "fibroid phthisis" or grinders' phthisis—as opposed to ordinary tuberculous phthisis—is a very long process, is it not, something extending over a good many years, possibly 10 or 15 years. Is that your experience?—Yes, it is of prolonged duration.

10831. And in these cases, for perhaps 5 or 6 years, although the man may certainly suffer from shortness of breath and some cough, he may have little or no important expectoration, or little bronchial expectoration, and the physical signs in the chest are very negative, are they not?—Yes.

10815. What was it they were endeavouring to ease themselves from?—It was with reference to the change of the construction of the furnace from the usual open furnace to a gas furnace.

10816. They felt that a little at first, do you mean?—These two men thought they would have a try.

10817. But the whole of the trade feel, do they not, that the gas furnace is more uncomfortable than the old system?—No, I do not think so.

10818. Assuming that the blazing light and heat might affect the eyes, and assuming that coloured glass was a guard against it, is there any difficulty in the manufacture that prevents men wearing blue glasses or coloured glasses?—I do not think there is any difficulty at all about it. I think these men complained of the great heat that the glasses caused them, and that was one of their reasons.

10819. At all events, they do not wear them in your place much?—No, they do not wear them at all; they discarded them altogether after those two men tried them.

10820. (*Chairman.*) Have you anything else you wish to state to the Committee?—No. I simply wish to say that in all my experience of 45 years in the trade, it has never been brought forward, to my cognisance or those connected with the trade, that cataract was a prevalent disease. My father, my grandfather, and great-grandfather have been in the trade before me, and I have never heard that there was ever any injury caused by the work to the eyesight of the glass maker.

10832. Would that also be in accordance with your experience in any cases that you have seen?—Yes, practically, except for the fact that the man is a grinder, and has these symptoms, he would be put down as having bronchitis.

10833. You start, of course, with the fact that he is a grinder?—Yes.

10834. And the movement of temperature is not particularly characteristic of the tuberculous disease?—As a rule when the patient comes for treatment the temperature is fluctuating.

10835. But at the end of some considerable length of time the man gradually becomes more and more incapacitated; there are signs of his blood being deficiently aerated, yet there is still an absence of anything like excavation going on, any active excavating process in the lungs, but the man does become incapacitated, and begins to cough more and suffer more and more from shortness of breath. Is that the kind of case which you see in your experience amongst grinders? I really cannot recall a case where I should not diagnose tubercle phthisis.

10836. Do you see out-patients at the hospital or dispensary on a large scale?—No, not on a great scale.

10837. But the group of symptoms I have put to you are not those of ordinary tuberculous consumption, are they?—No.

10838. Then if at a later stage of such disease, say, after the lapse of 5 or 6 years or more, tubercle bacillus is found in the sputum, even then the history of the case is not that of an ordinary case of tuberculosis of the lungs, is it?—No.

10839. So far, then, as those cases I have put to you, you do not know of any such cases at all?—No, not apart from slow tuberculosis of the lung.

10840. But the cases I suggest are very different from ordinary tuberculosis of the lung. Have you seen any *post-mortem* on men who die of grinder's fibrosis?—Yes.

10841. Can you tell the Committee what your observations have been on *post-mortem*. Could not you tell, for example, by *post-mortem* of the lung, whether it was grinder's phthisis or ordinary tuberculous phthisis?—The presence of the stone dust in the lung would make a difference.

10842. If it is grit it acts as a strong irritant on the lung, does it not?—Yes.

10843. And sets up a good deal of fibrous inflammation in the lung, which is not tubercle?—No, it is not at first, I suppose.

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Mr. W. S.
Kerr, M.B.,
C.M., F.R.C.S.

Mr. W. S. Kerr, M.B., C.M., F.R.C.S. 10844. (*Chairman.*) Have you ever in your medical career had many cases of grinder's phthisis pass through your hands?—Yes, I have seen a good many.

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Mr. HOLMSHAW, called and examined.

Mr. Holmshaw. 10848. (*Chairman.*) Are you the Secretary of the Sheffield United Cutlery Council?—Yes.

10849. Which represents, does it, the employees in the cutlery trade in Sheffield?—Yes.

10850. Do your members suffer considerably from fibrosis of the lungs?—Yes.

10851. Are you of opinion that that is a disease specific to the employment—a trade disease?—Yes.

10852. Are most of your members employed by large employers, or by small employers?—Both.

10853. And I suppose there are a good many in Sheffield who are employers on a very small scale themselves?—Yes, that is so.

10854. And work at the trade also?—Not in the ordinary sense—not as much as used to be, if I may explain. We have men who employ one or two journeymen, but they are not what you would term manufacturers; they simply fetch the work from the manufacturer, do it at piece rates, and pay one or two men to help them at day rates of pay.

10855. Are there a considerable number of such men?—Yes; there are a fair number of those.

10856. Has your society considered the question of the inclusion of grinder's lung, if I may use that term, among diseases for which compensation should be paid under the Workmen's Compensation Act?—We have not really considered it, and I see very great difficulties in the way of it.

10857. What difficulties?—It is due to the occupation. Of course, I take it you understand I am speaking now for grinders more especially, or grinders and cutlers. The cutler is the man who puts the parts of the knife together, and the grinder, of course, is the man who grinds them.

10858. How far is the cutler exposed to dust?—In grinding the parts of his knife; for instance, when he puts the parts of a pocket-knife together they will be not even, so that to make them even he has to grind them on a dry emery wheel.

10859. Do the cutlers suffer from grinder's lung?—Not to any appreciable extent, because it only occupies such a small portion of their time.

10860. Less than the grinder?—Yes, the grinder is at it all along.

10861. Do you ever come across cases among the cutlers?—No.

10862. So that your remarks will apply solely to grinders, will they?—Solely to grinders.

10863. But the cutler would grind something more or less every day, I suppose?—I should think it would depend very largely upon the class of work. For instance, where they have a division of labour, and where they are dealing with common pocket-knives, they would be doing it every day. In the better class of spring knife it occupies a very small portion of their time.

10864. Would the average cutler grind 20 hours a week?—The ordinary cutler would not.

10865. Ten?—I should question whether he would ten, but you might fix it at ten. But the man engaged on the cheap pocket knife work in the team would be practically doing very little else. The same thing applies as to some parts of table knives. They give it the technical term of "mousing," which is really using a very rough emery wheel.

10866. Then, in your opinion, it is the grinders whom we have solely to consider?—Yes, it is the grinders.

10867. And the cutlers, in so far as they are engaged in grinding, exposed to similar dust?—Yes.

10868. Do you consider that this disease affects men who grind horn?—I have no experience of that.

10869. Or mother-of-pearl?—I do not know that.

10846. Have you seen any cases of injury to eyes amongst men engaged in electric welding?—No, I have not.

10847. Is there anything else you would desire to lay before the Committee?—No, I do not think I have anything more to say.

10870. Or ivory?—I could not say; ours is cutlery.

10871. You were saying that there were considerable difficulties, in your opinion, that stood in the way of scheduling this disease; what do you mean by that?—Of course, you know, that in Sheffield the disease is compulsorily notifiable as consumption now.

10872. Is that under the local Act?—Yes, which was passed a few years ago.

10873. (*Professor Albutt.*) Is it compulsory notification of phthisis?—Yes.

10874. Would that include, so far as you know, both common consumption and grinders' consumption?—Yes. I think the medical men get half-a-crown for each case they notify to the Medical Officer of Health, and then the consumptive person is visited by an Inspector from the Medical Officer of Health, and is given a vessel in which to spit his sputum, which he is supposed to carry about with him.

10875. So far as you know, no discrimination would be made in such visitation between the common consumption, which anybody is subject to, and grinder's consumption?—No, there is no distinction.

10876. (*Chairman.*) What are the difficulties which you refer to?—The consumption, I believe, and I have been amongst it all my life, and have seen scores of cases, is due to our bad workshops. They are defectively constructed. In many cases they are made out of old house property, which is no longer fit for human habitation, and there are no sanitary requirements. Then, many of the men are practically independent. They go to the warehouse of their employer for their work, and take it to, perhaps, in many cases, an entirely different factory to where it is given out—what is known in Sheffield as the "tenement factory." They pay a certain amount for the use of that room, with power varying from 3s. 6d. to 7s. per trough, depending upon the class of grinding. There is a difficulty in dealing with these men, because they are really, in a sense, employers, although, under the Compensation Act, many firms make a reduction to cover liability; so, I suppose, if they had a stone break and an accident happened, they would come under the Compensation Act. It is a point that I have not really considered very much.

10877. Is your point that the workman would have to look for his compensation to a very small employer?—No, that was not my point, because he might have to look to a very large employer as well.

10878. Then what is the special difficulty of scheduling this disease which arises from this method of conducting the industry?—I think it would be a rather complicated question. For instance, we are supposed by law to have a fan to carry off the dust. The man himself is responsible for the efficient working of the fan. Now, the fan, I believe, is a powerful factor in preventing consumption by taking the dust away; and if the man neglects it, how would the thing stand then? If he neglects to provide an efficient fan, and our system of factory inspection is such that it is practically no use, it does not seem to me to be quite fair to say that an employer, who never sees the place the man may be working in, should be responsible for the misdoings of that man.

10879. But would not these men be outworkers?—Yes.

10880. And they would not come under the Act at all. They are not workmen within the meaning of the Workmen's Compensation Act, either as regards accident or disease. That was the reason why Parliament excluded them, because the employer had no control over the manner in which the work was carried on. Therefore, you can put aside from your consideration that class of men altogether?—Then, let me take the inworkers.

16881. You would have the workers in the factories and the one or two workpeople, journeymen, who would

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be employed by the small tenement factory employer—those would be the two classes who alone would be considered. Is not that so?—Yes, I suppose that would be so; and, so far as they are concerned, I see no difficulty whatever in scheduling them. But I was taking the question on the whole and the case of the man working on his employer's premises—and that is becoming more and more the custom in Sheffield. Hitherto it was the exception for an employer to have his men gathered under one roof; there the employer does find a wheel, for which the man pays a rent, but the man finds his own tools.

10882. Can the employer discharge them?—Yes.

10883. And he pays him his wages?—He pays him piecework.

10884. There is a contract of service, is there?—There is a contract of service, with a custom of giving and taking, generally, a month's notice.

10885. Are you sure that the grinder is the employers' workman, and not merely the employer's tenant?—No, he is the employer's workman.

10886. When accidents happen nowadays does he get compensation?—He would, though I do not remember a case.

10887. Are there never any accidents amongst these workpeople?—Plenty; but I do not know of a case coming under the Workmen's Compensation Act yet.

10888. You have never heard of a case in Sheffield of one of these workpeople getting compensation under the Workmen's Compensation Act, although he is working in a grinding factory?—No, I cannot call one to mind just at the moment.

10889. You are sure, are you, that the relation between the workman and the employer, the owner of the factory is not that of a contractor and tenant rather than that of a workman?—Quite sure. The proof of that is that some few years ago one of the firms was sued by a man for not paying him wages when they were stocktaking, and the man recovered for loss of time. During the time of stocktaking no work is given out. In some firms I know it is customary to give the men notice to terminate their engagement, which would expire at the commencement of stocktaking. It is quite understood that that is to guard the employer from being sued for loss of time.

10890. I am greatly surprised to learn that you have never had any case in the last ten years to your knowledge in which a man has recovered money for an accident under the Workmen's Compensation Act. Have not you had wheels burst?—Yes.

10891. And men being injured?—Yes; but I do not remember a case where a grinder has got compensation from his employer for an accident. He could do so, and I base that on knowledge of cases I know. And I know that a certain sum weekly, about 2d. per man, is deducted from the wages for insurance for that purpose.

10892. I may say there is some doubt as to whether your view is the correct one, and whether these men are workmen or not?—I know. There is a case pending now in the County Court of a spring knife grinder at one of the large firms which was tried a fortnight ago, and on which the County Court judge has not yet given his decision. That is a case of an employer and his workman, and in that particular case they were finding a man three days work a week and charging him full rent, and he sued them for the difference. The plea set up by the firm was that this man was a contractor and not a workman, and the decision has not yet been given.

10893. The relation between the small tenement factory owner and his one or two journeymen is clearly a relation of employer and employed, is it not?—Yes.

10894. And if this disease were scheduled the journeyman would be able to obtain compensation from his particular employer, if the employer were in a position to pay, that is?—That is the point.

10895. Are you aware that in the early stages of consumption it is very difficult to say whether the man is developing consumption or whether he is merely suffering from cough or bronchitis. A man in that condition may go on for some years, may he not?—Yes, it varies very largely; sometimes it develops very quickly, and at other times it takes longer.

10896. At all events there is a period in the progress of the illness when no one can say whether it is going to develop into phthisis or whether it is not. Is not

that so? The man has symptoms which may be the preliminary symptoms of phthisis and which may not?—I suppose doctors say that, and we are starting with that idea in Sheffield. I happen to be a member of our City Council, and we are starting now a sanatorium, but it is a kind of what one may term a clearing-house business. The idea is to locate people suspected of it in this building to examine them; then if they are really found to be consumptive and sanatorium treatment would do them good, to keep them for a time and draft them back.

10897. Supposing this disease were scheduled, and employers were made liable to pay compensation whenever it was ascertained, what would be the position of an employer who had a man who was somewhat asthmatic, as one may say, and who suffered from shortness of breath, with a cough in the winter and a little bronchitis. The employer would know that if that developed into fibrosis he would perhaps have to pay the man half wages for the rest of his life, and if he died he would have to pay three years' wages. Do you think there would be any probability that employers would refuse to go on employing such men and would discharge them before the disease was clearly established to be fibrosis, and before the compensation could be claimed?—It seems to be a natural tendency. If an employer saw a man coughing very badly, he would naturally think he would get rid of that man, especially as he would only have to give him a month's notice.

10898. What would become of that man?—I suppose the same as all the rest—the workhouse.

10899. Would he be able to get any employment anywhere else?—Probably under the tenement system.

10900. But how would he be able to get employment when anybody knew that perhaps he might be liable to pay him half wages if he became incapacitated?—If the man was working for the employer on the firm, he would be a direct workman of the firm, and supposing he got the work and took it away to a tenement factory to do, it is a question whether he would be a workman or not.

10901. He would become a small employer himself, or do the work independently, you mean?—Yes. I do not know whether that would clear him or not.

10902. If he could get the capital?—It requires no capital really. A man with a few pounds could get a set of tools, and if he had not the money he could get work with someone else's tools. There would be no difficulty in that way.

10903. Do you think it would be any advantage to that man to have this disease scheduled, because he would not get any compensation and would have lost his employment?—I do not think the scheduling of a disease is an advantage to a man who has the disease already; but I take it that workmen's compensation and everything else is with the idea rather of preventing than curing, and I can see many advantages with regard to the in-workers in scheduling the disease. The employer would be compelled to provide better workshops and workrooms.

10904. But whenever he found that any man was showing the preliminary symptoms of phthisis—which may last four or five years—he might get rid of that man, and never pay any compensation at all, might he not?—But if it could be shown that the man had the germs of the disease before the employer could get rid of him?

10905. Certainly—he could then claim compensation. But the point is that this particular disease very frequently, indeed as a rule, takes a long period before it develops ordinary tuberculous symptoms. Supposing the fibrosis takes a very long period, what the Committee are afraid of is, that, while the disease is in its early stages, invariably the man would be discharged?—Yes, I daresay there would be that danger.

10906. And consequently no one would get any compensation. There would be no pressure on the employer to improve the conditions, and the only result would be that a considerable number of men, who might not develop fibrosis at all, as a matter of fact, would be thrown out of employment?—Yes, I see, of course, there is that danger.

10907. Do you think it is a real danger?—I think it is a real danger.

10908. Looking at it solely from the point of view of the workmen, admitting that the workman has

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a perfectly just claim against the employer for compensation for fibrosis, and that Parliament would be fully entitled to call upon his employer to pay, do you think, taking all the circumstances into consideration, it is to the advantage of the workmen in the trade that this disease should be scheduled?—I am rather inclined to think not. I think it would be scarcely to the workman's advantage. I can see many disadvantages; and it is not the same as an accident. I do not know what course is proposed in the other trades, I am sure; but I suppose our trade in Sheffield is peculiar to Sheffield.

10909. Your trade stands on the same footing as ganister mining, tin mining, and stonemasons' work, and the potteries. Those are the trades in which fibrosis is particularly prone to develop from dust?—What, of course, I am concerned in more than anything else is to prevent it; and anything that would make our workshops better, and make the employers show more consideration for the men, and the men to show greater consideration for themselves—which I am sorry to say is not always the case—would be an advantage to us, and help to stamp it out. It is terrible with us. I have been secretary to my trade for 13 or 14 years, and with only about 190 men in the trade, I can reckon up easily over 100 who have died, the bulk of them of consumption, during that period, and we always have them, and have them now, in that state.

10910. (Mr. Cunynghame.) I suppose conditions have improved in the last, say, 15 years?—It is very difficult to say. I have a man who came on our sick fund only a fortnight ago with the first symptoms.

10911. But things have improved generally, I suppose, within the last 15 years?—I should not like to say they have.

10912. You can recollect 15 years ago in Sheffield, and can recollect what the grinding of bicycles was, I suppose?—I am speaking of the cutlery trade.

10913. You do not know much about grinding of big articles, such as bicycles and fenders?—There has been none done in Sheffield really worth speaking about. Ours is grinding knives, files, and edged tools.

10914. And razors?—That is included in cutlery.

10915. With regard to these tenement factories, a large number of the men, I suppose, are really employing men under them?—Yes.

10916. That used not to be so in the old days, used it?—Yes, more so than it is now.

10917. Are they greatly diminishing in number?—There used to be more of the team system than there is to-day.

10918. Then it is a difficult thing to say of a man who is working with his own tools, but with power supplied by the employer, whether he is a workman himself or a factory occupier, is it not?—No. I know the point is a disputed one, but it seems to me to be clear to say that if I work, as I used to work, as an out-worker, and find my own tools, and pay a rent for the work, and they pay me a fixed piece price, which is a custom of hundreds of years, I am a workman to all intents and purposes.

10919. That is the point which is difficult to decide—whether you are not a contractor, working, it is true, under their roof, and paying for power, but really an independent man on your own hook?—Yes.

10920. (Chairman.) Can they determine what work you shall do, or do you determine it yourself?—It is generally a question of custom. It is recognised that a certain man does a particular class of work.

10921. (Mr. Cunynghame.) Supposing you choose to do your work rather industriously, and work away on Monday and Tuesday, and give yourself a holiday on Friday, you have a perfect right to do so?—Yes, so has a day man.

10922. And you could bring in a man under you, if you liked, and pay him a wage agreed upon between you, to assist you in doing any part of the work, or in doing the whole of it?—No, not the whole of it. The employer would begin to say something.

10923. Not if it was equally well done, would he?—I suppose not; but at the same time, he would take me as being responsible for it.

10924. Yes, you would be responsible; but the ques-

tion is whether you would be his workman or sub-contractor. Those tenement factories, or a number of them, are in a bad condition as to dust, are they not, at present?—Yes.

10925. And the half-wet work is as bad as any part of it, is it not?—Yes. But of course it is the dry grinding that is the trouble, where you swallow the particles of dust and steel given off in the work. We have never heard the question raised until just recently as to whether we were workmen or whether we are contractors.

10926. It is pretty clear, is it not, that, supposing the tenement worker, as I will call him, employs a man under him, he would be liable to that man under the Workmen's Compensation Act?—It is clear that the journeyman is a workman; there can be no dispute about that.

10927. And his master is the tenement tenant?—Yes; he pays him so much per hour. He is the tenant, it may be, of a public company, who own the grinding wheel. But I do not see that difficulty myself in the case of a firm which employs a great many men on its own premises, and allows them to work for no one else.

10928. Has not it also become the custom now for the owner of the tenement factory to provide against the liability of the tenant to his own under-workmen?—Not in the case of a tenement factory.

10929. I have known of one or two cases of it?—I have not; and I should not think it necessary either.

10930. But then they get a solid man to look to, do not you see?—Yes.

10931. (Professor Albutt.) Whether it be desirable to schedule fibrosis or not, you speak positively, I understand, of its prevalence, and that it does occur?—Yes, I do.

10932. To a serious extent?—A very serious extent.

10933. Do you say that, not speaking as a medical man, but as a general observer, it means something different from the common consumption which occurs among the general public?—Yes; I am speaking strictly of what we find amongst the grinders, and nothing else.

10934. Are you disposed, as far as lay information goes, to say that the two can be distinguished, and that they are somewhat different?—I could not say that. I have had no experience of consumption except among grinders.

10935. You said that sometimes grinder's phthisis is rapid, and sometimes it is very slow?—Yes; we have had men on our sick fund for three or four years with it, and we have had them on not more than three months, and even less than that, before they have died.

10936. When you say, "On your books," do you draw any distinction between common phthisis and grinder's phthisis?—No, we cannot. If we excluded phthisis from our sick pay we should be excluding one-half of our members probably, because it is what they nearly all ultimately suffer from. If I tell you that probably out of our 190 men, roughly speaking, we have not more than 25 over 50 years of age, and not 10 over 60 years of age, and none over 70 years of age, it shows how they must die off very young.

10937. It used to be said that they are a very intemperate class of men?—There is very little intemperance among the men.

10938. At any rate, are you under the impression that the reason why the average age is so low is because of dust phthisis?—Yes; and I do think, and I have told our men so again and again, that they are very much to blame. They do not keep their places as clean as they ought to do, and they do not use their fans as they ought to do. At the same time, it is very difficult, when you consider the floors are simply mud floors, which, at every step you take, causes a lot of dust, so you would have to be sweeping all the day to keep the places clean; they ought to be concrete floors.

10939. Speaking generally, grinder's phthisis is a very slow process, is it not?—It varies so much. I can only speak from what I know of my own friends dying from it. I knew one of the best workmen, and steadiest in our trade, who never tasted a drop of drink in his life, who was three or four years on our funds before he died, and he had every care. In another case, a young

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fellow died a little while ago at 23, and he was only on sick pay three months.

10940. Have you any knowledge as to whether these two individuals died from common consumption or grinders' consumption?—I only know they were grinders, and worked, probably, from very early years at the trade.

10941. (*Dr. Legge.*) Do I gather that you want the relation of the workman and the employer under the same roof to be extended and the tenement system to gradually cease?—Yes. I would prefer to see the tenement system done away with.

10942. And the workmen in one factory under an employer?—Yes; I think that, on the whole, would be better.

10943. Do you think that scheduling the disease might hinder that tendency which is going on now, owing to the responsibility that the employer would feel in regard to the disease?—No, I do not think so, because the employer has so many other advantages by having his men close at hand in getting his work through more quickly.

10944. So that even the reason of having to compensate the workmen would not hinder him?—We find that since the Workmen's Compensation Act has come into force, the tendency for the employer to build a factory and get his men there is still going on. You have to bear in mind that it pays to do that. A grinding wheel property pays very well; and when you remember that every tenant, both cutler and grinder, pays his employer a rent, it means a very good interest on the outlay, plus the convenience of having the men there and being able to superintend the work more readily.

10945. (*Chairman.*) Which class of grinders are the members of your society?—Our society consists of scissors grinders. In Sheffield each branch of the grinding trade has a union to itself; we have a Scissors Grinders' Union, a Pocket Blade Grinders' Union, and a Razor Grinders' Union.

10946. You speak on behalf of the Sheffield United Cutlery Council, do you?—Yes, what applies to one class practically applies to all.

10947. Does your council include all the unions you have mentioned?—It includes, besides my own, the razor, the edged tools and files, and cutlers.

10948. Which class of working people in those trades does your society include—does it include the owners of the little outwork shop, or their journeymen, or the occupiers of the tenement factories?—It includes all the workmen, whether they are journeymen or whether

they are pieceworkers, whether they work in the tenement factories or on the employer's premises.

10949. Does your union include a large proportion of all of those?—It includes a very fair proportion; we have not got them all in.

10950. Have you considered who should pay the compensation if this disease were scheduled? I suppose a man will work for several employers over a period of 10 or 15 years sometimes?—Yes, and the man who works in the tenement factory may work for several employers at the same time, but not a man who works on the employer's factory.

10951. Then who do you think should pay the compensation?—There is only one, and that is the employer.

10952. But if the disease has been going on for 10 years, and he has worked for four or five different employers during that time, who ought to pay the compensation?—I suppose the last. It is a complicated matter, I know.

10953. But, on the whole, you are inclined to think, as I understand, that in the interests of the men themselves it might be better to proceed by way of prevention of the disease rather than by way of compensation?—I think so, if we could have that—if it comes within the scope of the Committee.

10954. It does not come within the scope of the Committee, but it does come within the scope of this Department. You have no statistics with regard to the prevalence of phthisis amongst your members, have you?—No, we have, unfortunately, not kept any.

10955. Do you think that what you have been saying with reference to the inclusion of this disease in the schedule represents the views of the workmen in the trade generally?—We have not discussed it, so I could not say.

10956. Do you know whether any others take strongly the contrary view that the disease should be included?—No, it has never come before our cutlery council. Of course, it will come before them after this.

10957. Were you not aware that this Committee was sitting, and that the matter had been discussed in Parliament, and that the question was pending?—Yes, I was aware of that, but we did not seem to have any direct interest in it. I did not know that I should be asked to come.

10958. No one on your council thought it necessary to approach this Committee or the Home Office in order to get the disease scheduled?—No, we have not.

Mr. A. M. SMITH, LL.B., on behalf of the Engineering Employers' Federation, and the Shipbuilding Employers' Federation, and Mr. A. SIEMENS, of Siemens Brothers and Company, Limited, Electrical Engineers, called and examined.

10959. (*Chairman.*) Mr. Siemens, are you a director of the firm of Messrs. Siemens, electrical engineers?—(*Mr. Siemens.*) Yes.

10960. And are you chairman of the Parliamentary Committee of the Engineering Employers' Federation?—Yes.

10961. Are you a solicitor, Mr. Smith, acting on behalf of the Engineering Employers' Federation and the Shipbuilding Employers' Federation?—(*Mr. Smith.*) Yes.

10962. The Committee have had under consideration the question of scheduling fibrosis caused by the inhalation of various dusts, amongst which are iron and steel dusts. Can you tell me whether you consider this complaint occurs amongst the workpeople in your industry?—(*Mr. Siemens.*) Very seldom. I have made particular inquiries at our works, where we at times often employ upwards of 3,000 men, and our works manager does not recollect to have had one single case during the 40 years the works have been going.

10963. Therefore, if this disease were scheduled you would not have to pay anything in the way of compensation, would you?—The difficulty which we foresee is that if you include more diseases which may arise you will give encouragement to all sorts of people to pretend that they have the disease, and we shall have to prove that they have not. There are always seafarers, or whatever you like to call them, amongst half-educated people, and if you give them an opening they will take advantage of it.

10964. You are afraid of a number of bogus claims,

are you?—Yes. The more avenues you give them the easier it is for them to raise bogus claims.

10965. What is the view of your Federation generally with regard to the inclusion of fibrosis in the schedule?—That if the disease is to be scheduled it should be strictly confined to workmen whose principal occupation is grinding and using the various modes of grinding stones, emery wheels, and other wheels, and so on.

10966. If a limit of hours were fixed, and a certain number of hours per week named, which would constitute a man a grinder, would that meet your views. For instance, if a man was engaged eight hours a week in grinding he might contract dust phthisis, I suppose?—I do not deny the possibility that he might; he might get it in three months, but the difficulty is to keep the time. There are men whose principal occupation is grinding; in some works there are men specially appointed for grinding tools. They would be classed as grinders without question. In other places, again, every workman grinds his own tools, and there are stones distributed for convenience sake all through the workshop, and it would be very awkward to keep the time of how long each workman goes to any particular grindstone to arrive at the eight hours.

10967. But if the schedule were limited to men who were really grinders in the ordinary acceptance of the term, however it might be framed in legal language, and if the burden of proof was thrown upon the workman to show that he had the disease, do you see great objection to scheduling it from the employers' point of view?—No, I believe in a way it is perfectly right that it should be scheduled, only the existence of the

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disease should not be a proof that the workman got it from his occupation, unless he is habitually employed as a grinder.

10968. The preliminary symptoms of the disease may last for some years before the nature of the illness can be clearly ascertained. Do you think that employers would be at all tempted to dismiss their workmen if they showed preliminary symptoms which might lead up to fibrosis, and entitle them to claim compensation?—That is really a question whether by extending this compensation generally you do not directly force the employer to do such things. I believe that a good deal of the non-employment is caused in that way. The men say we do not care about employing men who are either old or in any way defective physically, because they are liable to land us in claims under the Compensation Act, and it is not at all unlikely, if an employer saw doubtful symptoms, he would dismiss the man. Of course, if there were decided symptoms of the disease the man would have a claim, and it is not at all unlikely that the employers would like to have medical examination compulsory of all men who are taken on. It works both ways.

10969. Do you know of any cases of injury to eyesight occurring amongst men engaged in electric welding?—I know that if you look at an arc light long enough your eyes begin to ache, and there is some gathering, but I do not recollect any case where it has led to any permanent injury.

10970. Have you known cases in which men have had to give up working for some days owing to injury to eyes due to this cause?—If they have persisted in going on looking into the light when it is too strong and the eyes begin to ache—if you go on you may be disabled for two or three days.

10971. And it is entirely within the man's option, I suppose; he need not go on unless he likes?—Yes. And anyone who has had anything to do with electric light knows it is dangerous to look into the light, and they do not do it.

10972. Are the men who are engaged in electric welding provided with glasses which would protect them?—Yes, certainly.

10973. (Professor Allbutt.) Do they use them; is it compulsory?—I do not think it is compulsory, but they have the sense to use them.

10974. (Chairman.) Do you get many cases or any cases?—No, practically none, because they all know of it. I am speaking of a long time ago, in 1878 and 1879, when I made some experiments with arc lamps, measuring the intensity, and so forth, and I got that disease or eye ache, and I know of two or three others, but when it had happened half a dozen times people began to take care, and did not look into the light. But it is nothing dangerous, I think; it does not injure the eyes for any length of time.

10975. Mr. Smith, you have heard Mr. Siemens' evidence, do you agree with its purport?—(Mr. Smith.) Yes; I might perhaps be allowed to amplify it to some extent. I understand that you took medical evidence on three diseases—first the caisson disease, secondly the fibrosis amongst grinders, and thirdly neurosis, due to vibration as affecting our trade particularly. With regard to caisson disease, we suggest you should alter the name of it to compressed air disease, because the name is misleading. Then we suggest that regulations should be issued by the Home Office preventing the men going into the pressure if they are unwell, or if they are suffering from previous illness, or if they are under the influence of liquor. We find that the majority of cases of compressed air disease are due to these causes, and there should be also regulations as to the precautions to be observed on entering and leaving the pressure. (Mr. Siemens.) Workmen do not like to be in the air lock for a long time, and therefore they make openings for themselves, take bolts out, and so forth, so as to reduce the pressure very often. If they are compelled to remain a long time in the air lock, and a certain time elapses before the pressure is reduced, then there is very much less danger; they should also be compelled on coming out, to lie down for five minutes.

10976. Does the time in the air lock count as part of their working time?—(Mr. Smith.) Yes. There will be no difficulty about that, and it will be infinitely to our advantage, because we have known of cases where men have withdrawn the bolts in order to reduce the pressure.

10977. (Professor Allbutt.) Then they can surrepti-

tiously make openings, can they?—(Mr. Siemens.) Yes. (Mr. Smith.) The chambers are very strong, but there are bolts holding down the mountings, which they remove.

10978. Is not it possible to take the entire control out of the hands of the employees?—They have really nothing to do with it. They have no control over the air pressure—they should go into the lock and remain there until the pressure is sufficient to allow them to open the door and get outside, because until the pressure falls the door cannot be opened.

10979-80. Then how can they make any change in the pressure?—They can only do so by interfering with the bolts. The instance I referred to was a case of interfering with the bolts, unscrewing the bolts, so that the pressure gets out by means other than legitimate means. The difficulty might be got over, and we suggest they should be tied up by regulations as to how they are to go in and come out of the pressure locks. With regard to fibrosis, reference has been made to the question of grinding tools, but that is not by any means the most important part of the grinding that is done in engine works. A great part of it now is done where filing used to be done. It is much faster and much easier for a man, if he is fitting two pieces of metal together, instead of, as under the old system, getting a file and rubbing down the bit jutting out, to put it on to a wheel. This is not confined to any single department; for the convenience of the workmen the wheels are put about the shops. The grinding of tools may be confined to a single department, and some establishments do all that by special men. In other cases men who have the tools grind their own. Then there is another point. If this regulation is to be made to apply generally it means that anybody employed in the engine works is subject to the disease, and that is a burden which we think should not be placed on the employers, because if these particles fly, they will fly right through the shop, and we contend that this lung disease is only found, or is usually found, where the air becomes impregnated with these dust particles, owing to confined space and bad ventilation. These conditions do not prevail in engine works—they are entirely different, and must be on account of the size of the products. Then with regard to the question of regulations, we suggest that regulations should be made by the Home Office, making it compulsory upon the men to use the precautions which are provided for them. I might instance a case where the employer at some works put up a ventilation fan, and laid a duct under the floor to several grinding machines, and branches were taken off this duct to hoods, over the grinding wheel. That fan and apparatus had not been going very long before it was deliberately blocked by the workmen themselves. (Mr. Siemens.) That was to suck away the particles. It was not to blow air into the shop, but it was to keep the dust away from the workmen. (Mr. Smith.) Then we suggest some definition should be given to the expression, "Silicious or metallic particles," because in an engine works or foundry, even the dust on the floor is silicious or metallic. Also that a definition should be given to grinding and also to grinders, and that grinders should be those whose principal occupation is grinding, and who do not do such work merely as ancillary to their own occupation.

10981. Do I understand from you that instead of men leaving their work to go to grind their own tools incidentally, there is also a system by which all the tools are ground by certain people?—Yes, in some establishments. That is where the number of tools and the amount of grinding necessary makes it desirable that they should have a special department for that work. Our point is that occasional grinders should not be included. Then on the question of neurosis, due to vibration, that is a subject on which we have considerable apprehension. There would be extreme difficulty in defining what neurosis is, and what is the cause of it. Take, for example, the nervous condition which would be set up by direct impact—for example in handling of pneumatic tools for caulking or rivetting, there is a direct impact, and there might be a local condition set up in a man's arm, but then again, if you consider the question of rivetting in confined spaces, and the enormous vibration and noise going on, it very much affects not only the man rivetting, but all others within the vibrating zone. If you are going to include these men, you will have to include practically everyone in the ship yards and engine shops. In the engine shops you have the

machinery revolving, and if you have to include all that it means you will set up a state of affairs that will give rise to an enormous amount of fraud, because any man, not feeling very well, will say he is suffering from some nervous complaint, and it will be quite possible, from a medical point of view, to assume that that nervous complaint was neurosis, due to vibration.

10982. There is a difference, is there not, between the vague allegation of general vibration and a man using his hand in some particular fashion, such as driving with a tool which jars the hand?—That would be due to impact, and would be local entirely.

10983. The use of a limb, such as the hand, with a continual jarring motion, would be much easier to distinguish than the case you put?—Yes, but the symptoms are almost entirely subjective.

10984. But they would be local symptoms, would they not, in the case I refer to?—I do not know sufficient about it to answer that.

10985. There would be a sprain of the ligaments?—That would be an extraordinary case, but we know of no such cases. When pneumatic tools first came out we heard a good deal about the effect of dirl.

10986. What would the man be doing?—Pneumatic rivetting, but those tools were discarded long ago for that very reason.

10987. (*Mr. Cunynghame.*) How would you define an occasional grinder for the purpose of inclusion? Supposing it became necessary to consider the question of scheduling, you have said that an occasional grinder should not be included?—It has been suggested that an arbitrary number of hours should be fixed.

10988. What would you think fair?—With regard to the question of an arbitrary number of hours, we have gone into it very carefully, and the advice of our people is that it would be wholly impracticable. For example, take the case of a fitter, who, instead of filing up his job, just puts it on to a wheel, he might be engaged for only two or three minutes; he might be at that wheel a dozen or two dozen times a day, or he might be three-quarters of his time going and coming from that wheel; how are we to keep a record of the time? When he leaves his job to go to the wheel it might be engaged by someone else, and he might have to wait five or ten minutes. Is all that to be included?

10989. That is what I am asking you. Supposing it were said a man who grinds not less than eight hours a week, should be deemed an occasional grinder, what would you say?—How would you keep a record of it?

10990. I suppose it would be a question of evidence?—Supposing a man has got the disease, there is a presumption in his favour, and we have to rebut that presumption.

10991. He has the disease, and the question is, is he an occasional grinder or not?—He would say he was. The question, then, comes to be when was the disease contracted, and was he an occasional grinder within the meaning of the regulations at the time.

10991*. Much evidence has been given to show that

only a small amount of grinding carried on persistently for a man's life will not give him the disease. I do not say whether it is right or wrong?—It may.

10992. There is not much chance of a man getting grinders' disease unless he is occupied a very considerable portion of his time at the work. Looking at the matter from that point of view, it would be necessary to say, then, those who are only occasionally grinding ought not to come within any rule that is made, and it then becomes necessary to inquire what do you mean by occasional grinding. You must take it as occasional grinding at the time the disease is contracted, must you not?—We draw the distinction between a grinder as a grinder. The grinder is a man whose principal occupation is grinding.

10993. That will not do—that means more than half the time; is that what you mean?—No, a man whose principal occupation is that of a grinder—a man who is in the works for the purpose of a grinder.

10994. Then the definition now is a man who is called a grinder. That will not do, will it?—A man whose usual or permanent occupation or trade is that of a grinder; that leaves out the occasional grinder altogether.

10995. But the definition is so vague that it conveys nothing to my mind. Take a man who is in a bicycle factory. A large portion of the work is done by grinding instead of with a file; a man who is engaged in doing bicycle hubs is partly a fitter and partly a grinder. You cannot say which is his main occupation, can you, or it seems to me it is very difficult. The judge would say: "I do not know what you mean by usual occupation"; his usual occupation involves him in about half work on each?—Whose usual or permanent occupation or trade is grinding, and that the grinding is not merely ancillary to his regular work would be a question of fact, which would have to be gone into in every case, and each case would have to stand on its own merits. Apart from the definition of grinders as grinders, what we suggest is that these occasional men should not be included. The difficulty we find is the question of keeping the time.

10996. You say there is a difficulty in the whole business from first to last, owing to the difficulty of saying what an occasional grinder is and is not?—Yes, and the absolute impracticability of keeping a record of that man's time, because we should have to keep a record for the whole twelve months, as we could never say when the man was going to contract the disease.

10997. (*Professor Allbutt.*) Do you think that fibroid phthisis, or grinders' phthisis, is prevalent amongst grinders in your trade?—No; we have no record of it being by any means prevalent. Of course, there is this to keep in view, if it is made the subject of regulation the attention of the medical men will be directed to it, but from inquiries we have made at our various districts, and particularly of medical men in the districts where we thought it would be met with, we do not find it prevalent.

10998. Is it the general opinion that the disease is more or less prevalent?—We do not find it so.

10999. From your own impression you would not say that it is prevalent?—No, our advice is the other way.

Mr. A. M. Smith, LL.B., and Mr. A. Siemens

23 April 1907.

THIRTY-NINTH DAY.

Monday, 6th May 1907.

MEMBERS PRESENT:

Mr. HERBERT SAMUEL, M.P. (*Chairman*).
 Professor CLIFFORD ALLBUTT, F.R.S.

Mr. T. M. LEGGE, M.D.

Mr. FRANK ELLIOTT (*Secretary*).

Mr. G. B. HILLMAN, L.S.A., called and examined.

Mr. G. B.
 Hillman,
 L.S.A.

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11000. (*Chairman.*) Are you in medical practice at the present time?—Yes.

11001. Where?—At Castleford, in Yorkshire.

11002. How many glass bottle works are there at Castleford?—There are two ordinary glass works working now, and there is one making the flint bottle, which does not quite apply to the question under discussion, because I do not think there is any suggestion that flint bottle hands get cataract at all.

11003. Did you furnish the certificates of the causes of incapacity to the Glass Bottle Makers of Yorkshire United Trade Protection Society, which the Committee have?—I did.

11004. Have you examined their members who have come on the superannuation fund?—Practically all who have been superannuated during the last nine years. There are a few that I have not examined, but only a very few, about 5 out of the 114.

11005. Is the list which has been handed to the Committee compiled from your certificates?—I believe so.

11006. Do you consider there is any excessive incidence of cataract amongst bottle workers?—Yes, I do.

11007. Do you consider that is due to their employment?—I think so.

11008. How do you think it arises?—I do not know. It may probably arise from the radiant heat, when they are exposed to very violent heat for a very considerable time every day.

11009. Are there cases of eye illness other than cataract due to that cause?—I do not know. I do not think eye diseases are excessive, as far as I know, excepting cataract.

11010. Is there any distinguishing symptom in these cases of cataract which would enable them to be differentiated from cases of cataract occurring to persons not belonging to that trade?—I do not think so. The cases I saw for superannuation were advanced cases, cases of men incapable of going on with their work on that account, and therefore it was impossible for me to say whether they were senile, or what kind of cataracts they were.

11011. If you saw those cases in their earlier stages could you tell what was the cause of the disease, and whether it was due to the trade or otherwise?—No, not definitely; one could not swear to it, I think.

11012. Would there be any indication at all?—I really cannot say, of my own knowledge. It is said to be so, but whether it is so or not I do not know.

11013. Do you think there would be great doubt in every case?—I should say so, to the ordinary practitioner, at all events.

11014. Would an expert oculist be able to find such marked symptoms as would enable him to say, "This is a case of cataract, due to the man's employment"?—I do not think so; that is only my opinion, of course.

11015. Have you come across cases of cataract among bottle workers at an age earlier than it is found among the general population?—As an average I would not like to say so, but there are men of about 50 years of age amongst them, who have advanced cataract, which is rather early.

11016. Do you occasionally find similar cases at that age amongst other people?—Yes.

11017. But are you inclined to think it may come more early amongst these men than amongst others?—I think it is quite probable.

11018. If compensation were payable in respect of these cases, would it be possible, in your opinion, for a workman ever to be able to prove that his particular case of cataract was due to the trade?—No,

beyond the fact that he has been exposed to the heat for a certain number of years, I do not think he could prove it definitely.

11019. In other words, unless compensation were to be paid to all glass workers who get cataract it could not be paid to any?—I do not think so.

11020. (*Professor Allbutt.*) You do not systematically examine the workpeople, I understand, with a view to discovering the initial stage of cataract?—No, I have not done so. Might I say also that these certificates were all compiled quite apart from any notion of cataract as a trade disease; they were certificates simply given to superannuate the men.

11021. But, as a matter of experience, you have not been called upon to examine all the men who are engaged in this industry, on the chance of some of them suffering?—No.

11022. You speak from having seen them only in the extreme stages, do you?—Mostly. There are some cases of early cataracts.

11023. Have you seen any in quite the initial stage?—I do not think so, because all the cataracts I have examined and certified have been sufficiently bad to prevent a man doing his work.

11024. (*Dr. Legge.*) I notice that in two or three of these cases you mention they are early cases of opacity in the lenses?—Yes.

11025. Were those still not so early as to enable you to distinguish them?—I did not think so. There were sufficiently bad to prevent a man seeing to do his work in every case.

11026. Do you know of any instance where an ophthalmic surgeon has examined an early case, and decided that the signs were those of ordinary senile cataract, and not of posterior cortical?—No, not in practice. I have read of it, of course, in Dr. Robinson's report, but I have had no patients of my own.

11027. When a bottle finisher comes before you to be examined for permanent incapacity, do you examine always for cataract?—Yes, I always do that.

11028. Is that because you have been so much struck by its prevalence?—Long before this inquiry I have been much struck with the prevalence of it.

11029. And if you found a cataract, would it strike you as being due to anything else than the man's work?—I would not like to say that, because the age has to be considered, but the fact of a man having been a bottle maker for a number of years would make one rather suspicious that his work had something to do with it.

11030. Not more than rather suspicious?—Well, very suspicious, but one cannot disregard the age of the man, of course.

11031. But its prevalence here has struck you that it is a trade disease, has it?—It has.

11032. Has any other class of disease which you have come across struck you as a trade disease among the patients who have come to you?—No, I do not think so.

11033. Apart from this one thing there is nothing else which has struck you?—No.

11034. Where do most of these people attend for treatment?—At the Infirmary in Leeds.

11035. Can you give me any idea of the relative population of the glass bottle makers from which the Infirmary draws its patients as compared with men engaged in mining?—Yes, I can, and I think I can give it you fairly accurately. In the Report of the Inspector of Mines for Yorkshire and Lancashire, Mr. Walker, for 1905, which is the latest report they have, the number of men over the age of 16 years, working

in the West Riding of Yorkshire, was as follows:—Underground, 83,388; above ground, 20,597; that is a total of 103,985. I inquired from the President of the Yorkshire Mining Association, which covers the Yorkshire mines, and he tells me that about one-third of these men are employed within a radius of 14 miles of Leeds; that is to say 27,796 men below ground, and 6,865 men above ground, making a total of 34,661.

11036. Have you any idea of the number of glass bottle finishers and blowers and gatherers?—Yes. I could not obtain it officially, but Mr. Greenwood, the secretary of the society you have referred to, has given me a return, and he says the number of men employed within a radius of 20 miles of Leeds, in December, 1906, was 622, and the number of men unemployed, 282, or a total of 904.

11037. Have you any idea of the relative number of cases of cataract that are annually treated, or have been treated, within the last five years in the Leeds Infirmary amongst these two classes of people?—Only from the figures which you yourself gave me some time ago.

11038. Do you remember what I gave you?—Yes; 13 cataract cases amongst coal miners in the three years 1903 to 1905, and 11 cases amongst glass bottle makers.

11039. Showing an enormous preponderance amongst the latter?—Yes, it works out at .037 per cent. amongst the miners, assuming these figures to be correct, and 1.21 per cent. for the glass bottle makers.

11040. (Chairman.) More than thirty times as much?—Yes.

11041. (Professor Allbutt.) Between the 14 miles radius, and the 20 miles radius, are there any bottle works?—I think not. I think 14 miles covers the distance. I can give you the places where there are glass works—namely, Castleford, Hunslet, Thornhill Lees, Knottingley, and Wakefield.

11042. (Dr. Legge.) When you distribute these cases that have occurred in the 9 years over different districts, and go still further and distribute them over the several factories in which they have occurred, does it work out to a very small number in each per factory?—A very small number indeed.

11043. So that if the diseases were scheduled the burden thrown on the employer would be a small one, would it not?—A very small one. You see there would be no possibility of malingering; either the man would have cataract or would not have it. It seems to me the thing could be proved definitely. It is not like an injury to the back, which could not be disproved.

11044. (Chairman.) But a question might arise whether or not he was incapacitated, I suppose?—Yes.

11045. Suppose it were scheduled, and the man was examined by an oculist at the instance of an employer, and it was found that he had the initial symptoms of cataract, the employer might dismiss the man, I suppose, in order not to have to pay compensation, and the man could not claim compensation because he was not incapacitated by the disease?—Quite so.

11046. (Dr. Legge.) Would incapacity be likely to develop within a year after he had been dismissed?—I think it probably would.

11047. (Chairman.) Within a year after the first symptoms had been detected?—Yes; I make that statement simply from the history I get from the men themselves. They usually say, for the last twelve months they have been seeing badly.

11048. (Dr. Legge.) Do you think, supposing an age limit was fixed beyond which a claim for cataract should not be allowed, it would prevent dismissal of suspected workers, and so the old hands would be kept on till, say, 65 years of age?—It would help, no doubt, but I doubt very much whether it would reduce the result entirely.

11049. (Chairman.) How long may a man have cataract before he is prevented from working at his trade?—It entirely depends upon how far the cataract progresses upon his field of vision.

11050. I mean from the first moment it can be detected until the moment when the man is absolutely compelled to stop working?—I really could not say, it varies so much.

11051. What would be the longest period from the

commencement of the cataract until the time that it obstructed the vision?—It might be some years with a slowly growing cataract.

11052. Some five or six years?—Yes. They vary so much that you cannot say.

11053. I was speaking of the maximum?—But I cannot quite say what the maximum is.

11054. (Dr. Legge.) The majority of these cases in the list are amongst men under 60 years of age?—Yes, the majority are.

11055. Still, is there a fair proportion that are over 60?—Yes.

11056. Have you anything that you would like to say as to the effect of scheduling the disease from the point of view of the workman himself?—My own view would be that the workman would be the person who would suffer most if the disease were scheduled.

11057. In what way?—I think it would shorten his working time of life, or the working time of life of the glass bottle maker, because some of the men who were not so clever as others would be suspected of having failing vision before the vision really began to fail, and notice would be given them.

11058. But would it not be counteracted if a limit of age were fixed beyond which a claim for compensation would not be entertained?—Then, suppose a man at 45 was not doing his work particularly well, or doing the amount of work they expected a man at that age to do, they would suspect his eyesight was failing, and he might make a claim before he was 50 years of age. I do not mean to say that the glass bottle manufacturer would discharge a skilled man and a man who was doing his work well, but I think it would give him a reasonable excuse for discharging a man who was doing his work inadequately, and these men vary very much so far as ability is concerned.

11059. Do you think, if the men took to wearing coloured glasses, an employer would imagine they were suffering from commencing failure of sight, and dismiss them, or would he be glad to see them wearing glasses?—The employers I know would be extremely glad to see them taking that precaution.

11060. Do you think wearing glasses has the effect of protecting the eyes?—I have not sufficient experience to say, but I should think so.

11061. Have you any reason to suppose that this list which we have here represents all the cases that have occurred amongst those 904 glass bottle workers you have mentioned?—My impression is that it does not represent anything like the whole number.

11062. Do you know of other cases that are not mentioned in the list?—No, I could not give any definite details about others, but the men do not apply for superannuation as soon as their eyesight fails, because it pays them to go on working far better if they can, as the superannuation is only 5s. per week.

11063. (Chairman.) Do you find them going on for a number of years, as a matter of fact, working with cataract?—Yes, some of these men distinctly have done that.

11064. You do not know how many years they would be able to go on?—No, I do not.

11065. Do you think there may be men at work now who have got cataract in its initial stages?—I do.

11066. Do you know whether the men are of opinion that it ought to be made the subject of compensation?—The opinion appears to me to vary. I have talked to men who have held quite opposite views amongst the workmen.

11067. What arguments did they adduce?—The arguments that the men use who do not want it scheduled is that it will simply encourage the employer to shorten their working days of life; the argument on the other side is that if they get cataract they ought to be paid.

11068. What is your own view?—My own view is that it would be unwise to schedule it from their own point of view.

11069. (Professor Allbutt.) Do you know how the suspicion arose that cataract may be the result of the trade? Did the men discover it or was it a matter of expert evidence?—I think it was a matter of expert evidence originally. I think Dr. Robinson, of Sunderland, drew attention to it some ten years ago.

Mr. G. B.
Hillman,
L.S.A.

6 May 1907.

APPENDICES.

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APPENDIX I.

STATEMENTS and TABLES handed in by DR. A. K. CHALMERS.

It may be useful to add a note regarding the movements in the death rates from :

- (a) All causes,
- (b) Phthisis, and
- (c) Other respiratory diseases, in Glasgow during several years.

DEATH RATE—All causes (both sexes):—

| Years. | Per 1,000. |
|---------------------|------------|
| 1871-2 - - - - - | 30.7 |
| 1880-2 - - - - - | 25.2 |
| 1890-2 - - - - - | 24 |
| 1899-1901 - - - - - | 20.7 |
| 1903-5 - - - - - | 18.3 |

DEATH RATE—Phthisis, all ages (both sexes), in several *quinquennia*.

| Years. | Rate. |
|---------------------|-------|
| 1855-59 - - - - - | 3.742 |
| 1860-64 - - - - - | 4.094 |
| 1865-69 - - - - - | 3.972 |
| 1870-74 - - - - - | 3.908 |
| 1875-79 - - - - - | 3.644 |
| 1880-84 - - - - - | 3.140 |
| 1885-89 - - - - - | 2.601 |
| 1890-94 - - - - - | 2.315 |
| 1895-99 - - - - - | 2.014 |
| 1900-1904 - - - - - | 1.712 |
| 1905 - - - - - | 1.437 |

DEATH RATE—Other respiratory diseases:—

| Years. | Rate. |
|---------------------|-------|
| 1881-90 - - - - - | 5.870 |
| 1891-1900 - - - - - | 4.993 |
| 1901-5 - - - - - | 4.140 |

COMPARISON OF DEATH RATES for males and females, separately, (1) from all causes, (2) from phthisis, (3) from other respiratory diseases, and (4) from phthisis and other respiratory diseases together:—

In the accompanying tables (I. to IV.) the population and deaths with corresponding rates are stated for each decennial period from 25 to 65. They are based on the Registrar General's returns, and represent three yearly averages surrounding the census years 1871-1901.

SUMMARY OF TABLES.

ALL CAUSES.—For males and females at each decennium, the rates are now lower than in the '71 period, and generally the male rate is in excess of the female rate save at the period 25-35.

PHTHISIS.—In the seventies the female rate exceeds the male at each age period, and is still above it at ages 25-45 in 1900-1902; from 45-65 it is below it.

OTHER RESPIRATORY DISEASES.—Here the female rate is uniformly lower than the male rate throughout.

ALL RESPIRATORY DISEASES, INCLUDING PHTHISIS.—As some inequalities appear in the tables when phthisis and other diseases of respiration are shown separately, it has been thought well to group all diseases of the lung, including phthisis, together. The result is to produce a more uniform movement in the rate, and shows that at ages 25-35 those for females are almost always, although only slightly, in excess, but in the succeeding decennial periods, and particularly after 45, the reverse is the case, and becomes pretty marked.

TABLE I.

DEATH RATE per thousand at several ages, and from All Causes.

| Years. | 25-35 | 35- | 45- | 55-65 |
|------------------|-------|------|------|-------|
| (a) MALES : | | | | |
| 1870-2 - - - - - | 12·8 | 20·7 | 32·8 | 51·6 |
| 1880-2 - - - - - | 10·3 | 16·7 | 28·2 | 46·8 |
| 1890-2 - - - - - | 10·0 | 15·5 | 27·0 | 47·9 |
| 1900-2 - - - - - | 9·3 | 15·4 | 25·5 | 50·9 |
| (b) FEMALES : | | | | |
| 1870-2 - - - - - | 14·4 | 18·4 | 25·0 | 40·0 |
| 1880-2 - - - - - | 11·9 | 14·6 | 21·9 | 36·4 |
| 1890-2 - - - - - | 9·2 | 14·0 | 21·1 | 38·4 |
| 1900-2 - - - - - | 10·5 | 13·0 | 21·3 | 40·2 |

TABLE II.

DEATH RATE per thousand at several ages from Phthisis.

| Years. | 25-35 | 35- | 45- | 55-65. |
|------------------|-------|-----|-----|--------|
| (a) MALES : | | | | |
| 1870-2 - - - - - | 4·8 | 5·4 | 4·8 | 4·1 |
| 1880-2 - - - - - | 4·0 | 3·7 | 3·4 | 2·5 |
| 1890-2 - - - - - | 3·2 | 3·6 | 3·4 | 2·2 |
| 1900-2 - - - - - | 2·6 | 3·1 | 3·5 | 2·4 |
| (b) FEMALES : | | | | |
| 1870-2 - - - - - | 7·7 | 7·2 | 6·2 | 3·8 |
| 1880-2 - - - - - | 4·9 | 4·1 | 2·5 | 1·6 |
| 1890-2 - - - - - | 3·5 | 3·2 | 1·8 | 1·1 |
| 1900-2 - - - - - | 3·2 | 3·3 | 2·0 | 1·1 |

TABLE III.

DEATH RATE per thousand at several Ages from "Other Respiratory Diseases."

| Years. | 25-35. | 35- | 45- | 55-65. |
|------------------|--------|------|-----|--------|
| (a) MALES | | | | |
| 1870-2 - - - - - | 1·8 | 4·3 | 9·4 | 17·9 |
| 1880-2 - - - - - | 1·7 | 4·1 | 8·6 | 14·1 |
| 1890-2 - - - - - | 1·7 | 3·8 | 8·8 | 16·8 |
| 1900-2 - - - - - | ·7 | 2·0 | 4·5 | 11·2 |
| (b) FEMALES : | | | | |
| 1870-2 - - - - - | 1·2 | 2·59 | 6·0 | 12·3 |
| 1880-2 - - - - - | 1·4 | 2·8 | 6·6 | 11·1 |
| 1890-2 - - - - - | ·9 | 2·8 | 6·1 | 12·0 |
| 1900-2 - - - - - | ·7 | 1·3 | 4·0 | 9·4 |

TABLE IV.

DEATH RATE per thousand from Phthisis and "Other Respiratory Diseases" combined.

| Years. | 25-35. | 35- | 45- | 55-65. |
|------------------|--------|-----|------|--------|
| (a) MALES : | | | | |
| 1870-2 - - - - - | 6·6 | 9·7 | 14·2 | 22·0 |
| 1880-2 - - - - - | 5·7 | 7·8 | 12·0 | 16·6 |
| 1890-2 - - - - - | 4·9 | 7·4 | 12·2 | 19·0 |
| 1900-2 - - - - - | 3·3 | 5·1 | 8·0 | 13·6 |
| (b) FEMALES : | | | | |
| 1870-2 - - - - - | 8·9 | 9·8 | 12·2 | 16·1 |
| 1880-2 - - - - - | 6·3 | 6·9 | 9·1 | 12·7 |
| 1890-2 - - - - - | 4·4 | 6·0 | 7·9 | 13·1 |
| 1900-2 - - - - - | 3·9 | 4·6 | 6·0 | 10·5 |

TABLE V.
POPULATION and DEATHS from All and Certain Causes at several ages.

| Years. | Age. | Average Annual Population. | Average Annual Number of Deaths. |
|---------------|----------------------------------|----------------------------|----------------------------------|
| (a) MALES : | | | |
| 1870-2 - - - | 25-35. | 39,534 | |
| | All causes - - - - - | — | 508 |
| | Phthisis - - - - - | — | 188 |
| | Other respiratory diseases - - - | — | 70 |
| | 35-45. | 25,833 | |
| | All causes - - - - - | — | 536 |
| | Phthisis - - - - - | — | 140 |
| | Other respiratory diseases - - - | — | 112 |
| | 45-55. | 17,609 | |
| | All causes - - - - - | — | 578 |
| | Phthisis - - - - - | — | 84 |
| | Other respiratory diseases - - - | — | 167 |
| | 55-66. | 9,952 | |
| | All causes - - - - - | — | 514 |
| | Phthisis - - - - - | — | 41 |
| | Other respiratory diseases - - - | — | 175 |
| (b) FEMALES : | | | |
| 1870-2 - - - | 25-35. | 42,544 | |
| | All causes - - - - - | — | 612 |
| | Phthisis - - - - - | — | 327 |
| | Other respiratory diseases - - - | — | 49 |
| | 35-45. | 296,79 | |
| | All causes - - - - - | — | 546 |
| | Phthisis - - - - - | — | 214 |
| | Other respiratory diseases - - - | — | 77 |
| | 45-55 | 20,820 | |
| | All causes - - - - - | — | 520 |
| | Phthisis - - - - - | — | 129 |
| | Other respiratory diseases - - - | — | 124 |
| | 55-65. | 13,007 | |
| | All causes - - - - - | — | 521 |
| | Phthisis - - - - - | — | 50 |
| | Other respiratory diseases - - - | — | 161 |

Among this population (see Q. 4270, *seq.*) there occurred during the years 1900-1-2, 8,681 deaths distributed as shown in the following table :—

TABLE VI.
GLASGOW.—1900-1-2. OCCUPATIONAL DEATH-RATES. ALL MALES.

| | Ages. | | | | Totals. |
|---------------------------------|---------|---------|--------|--------|---------|
| | 25- | 35- | 45- | 55-65 | |
| ALL MALES. | | | | | |
| Years of Life - - - - - | 197,466 | 139,413 | 96,936 | 55,242 | 489,057 |
| Deaths - - - - - | 1,572 | 1,992 | 2,511 | 2,606 | 8,681 |
| Death rate per 1,000 - - - - - | 7.8 | 14.3 | 25.9 | 47.1 | 17.7 |
| GLASGOW LIFE TABLE. | | | | | |
| 1881-1890 - - - - - | 9.3 | 15.2 | 26.5 | 45.8 | — |
| 1892-1900 - - - - - | 8.2 | 14.2 | 24.8 | 45.5 | — |
| INDUSTRIAL DISTRICTS (England). | | | | | |
| 1890-92 - - - - - | 8.7 | 15.9 | 27.8 | 50.2 | — |

The deaths here shown for ALL males at ages 25, 35, 45, and 55-65 read 7.8, 14.3, 25.9, and 47.1 respectively, while the death-rate for the whole period 25-65 is 8.0. In order to compare the rates thus ascertained with those for corresponding age periods, but obtained otherwise, I have added three horizontal lines at the foot of the table. The figures in these lines are (1) Death-rates of occupied males in industrial districts, 1890-92; (2) Life table for Glasgow, 1881-1890; and (3) Life table for Glasgow for 1892-1900. Bearing in mind the different periods, the rates given show a fair correspondence with those calculated on the observed occupational deaths in Glasgow, and we shall not err much, I think, in assuming that any occupation showing a markedly higher death-rate at any of the four age periods than is there shown is associated with some influence more prejudicial to vitality than those occupations where the rates are lower.

From the tables thus prepared I select a few occupations for comparison.

TABLE VII.

GLASGOW 1900-1-2.—DEATHS and DEATH RATES from ALL CAUSES in certain occupations, together with comparative mortality figure for each group.

| Group No. | Occupation. | Ages. | | | | C.M.F. All Males. |
|-----------|---|--------|--------|--------|--------|----------------------|
| | | 25. | 35. | 45. | 55-65. | |
| | Death rate—all Males - - - | 8.0 | 14.3 | 25.9 | 47.1 | 1,000 |
| IX. - | Mines and Quarries— | | | | | |
| | Years of life - - - - - | 3,114 | 2,274 | 1,611 | 828 | 1,143 |
| | Deaths - - - - - | 32 | 38 | 47 | 42 | |
| | Death rate per 1,000 - - - - | 10.2 | 16.7 | 29.1 | 50.7 | |
| X. - | Metal Workers— | | | | | |
| | Years of life - - - - - | 42,285 | 30,564 | 20,667 | 10,458 | 743 |
| | Deaths - - - - - | 245 | 324 | 392 | 382 | |
| | Death rate per 1,000 - - - - | 5.7 | 10.6 | 18.9 | 36.5 | |
| XIV. - | Brick and Cement Workers, &c.— | | | | | |
| | Years of life - - - - - | 1,962 | 1,569 | 1,164 | 570 | 1,332 |
| | Deaths - - - - - | 25 | 28 | 51 | 24 | |
| | Death rate per 1,000 - - - - | 12.7 | 17.8 | 43.8 | 42.1 | |
| XIX. - | Textiles— | | | | | |
| | Years of life - - - - - | 8,463 | 6,420 | 4,905 | 2,838 | 1,197 |
| | Deaths - - - - - | 76 | 106 | 161 | 174 | |
| | Death rate per 1,000 - - - - | 8.9 | 14.9 | 32.8 | 61.3 | |
| XXII. - | General and Undefined Workers, and all Labourers— | | | | | |
| | Years of life - - - - - | 24,306 | 19,416 | 13,422 | 7,362 | 2,032 |
| | Deaths - - - - - | 425 | 539 | 698 | 696 | |
| | Death rate per 1,000 - - - - | 17.4 | 27.7 | 52 | 95.9 | |

The comparative mortality figure here has been constructed by the usual method. In each of the groups given, save metal workers, the death rates are for given periods, and in consequence the comparative mortality figures are all above the rates for "ALL MALES" at corresponding ages. But the rates given for metal workers are low enough to suggest that some deaths belonging to this group have, because of an inaccurate statement of the trade, been omitted; and the time at my disposal has not been sufficient to enable me to recast these.

In addition to these one unforeseen difficulty presented itself. In the local classification of deaths no information was given by which the several classes of labourers might be separated, and in consequence what is here called Group 22 includes ALL LABOURERS, irrespective of whether they were dock, railway or otherwise, with the result that the comparative mortality of this group is more than twice that of "ALL MALES."

Even allowing for both contingencies, I am disposed to think that the rates of mortality of the metal workers group would not be raised above that of "ALL MALES."

INQUIRY REGARDING THE PREVALENCE OF PHTHISIS AND OTHER RESPIRATORY DISEASES.

It would be among this group of diseases that fibroid disease of the lung, and pneumonia induced by the inhalation of basic slag would appear, so that the analysis has been carried to show the death rates from phthisis and from other respiratory diseases separately. In Table C which follows, the deaths from phthisis among those occupations are compared with the deaths from the same disease affecting ALL MALES at these ages. The results given point to a lower prevalence of phthisis among metal workers than among miners, brick and cement workers, textile workers, general and undefined workers and all labourers.

TABLE VIII.
DEATHS AND DEATH RATE FROM PHTHISIS for corresponding Groups.

| Group No. | Occupation. | Ages | | | |
|------------|---|--------|--------|--------|--------|
| | | 25- | 35- | 45- | 55-65 |
| All Males. | Death rate, Phthisis - - - - - | 2·6 | 3·4 | 3·8 | 2·6 |
| IX. - | Mines and Quarries— | | | | |
| | Years of life - - - - - | 3,114 | 2,274 | 1,611 | 828 |
| | Deaths - - - - - | 7 | 9 | 5 | 2 |
| | Death rate per 1,000 - - - - - | 2·2 | 3·9 | 3·1 | 2·2 |
| X. - | Metals, Machines, etc.— | | | | |
| | Years of life - - - - - | 42,285 | 30,564 | 20,667 | 10,458 |
| | Deaths - - - - - | 68 | 63 | 38 | 25 |
| | Death rate per 1,000 - - - - - | 1·6 | 2·05 | 1·8 | 2·3 |
| XIV. - | Brick, Cement, etc.— | | | | |
| | Years of life - - - - - | 1,962 | 1,569 | 1,164 | 570 |
| | Deaths - - - - - | 7 | 8 | 19 | 2 |
| | Death rate per 1,000 - - - - - | 3·5 | 5·09 | 16·3 | 3·5 |
| XIX. - | Textiles— | | | | |
| | Years of life - - - - - | 8,463 | 6,420 | 4,905 | 2,838 |
| | Deaths - - - - - | 31 | 37 | 29 | 17 |
| | Death rate per 1,000 - - - - - | 3·6 | 5·7 | 5·9 | 5·9 |
| XXII. - | General and Undefined Workers, and all Labourers— | | | | |
| | Years of life - - - - - | 24,306 | 19,416 | 13,422 | 736·2 |
| | Deaths - - - - - | 159 | 137 | 116 | 41 |
| | Death rate per 1,000 - - - - - | 6·5 | 7·1 | 8·6 | 5·5 |

TABLE IX.

DEATHS AND DEATH RATE FROM BRONCHITIS, PNEUMONIA, PLEURISY, AND OTHER RESPIRATORY DISEASES (excluding Phthisis) for corresponding groups, the Death Rate being calculated on the number of persons living and working at each age at the specified occupations.

| Group No. | Occupation. | Ages. | | | |
|-----------|--|--------|--------|--------|--------|
| | | 25. | 35. | 45. | 55-65. |
| | Death rate per 1,000—all Males - - - | 1.5 | 3.6 | 7.5 | 14.5 |
| IX. | Mines and Quarries— | | | | |
| | Years of life - - - - - | 3,114 | 2,274 | 1,611 | 828 |
| | Deaths - - - - - | 6 | 8 | 22 | 19 |
| | Death rate per 1,000 - - - - - | 1.926 | 3.518 | 12.656 | 22.946 |
| X. | Metals, Machines, etc.— | | | | |
| | Years of life - - - - - | 42,285 | 30,564 | 20,667 | 10,458 |
| | Deaths - - - - - | 46 | 84 | 126 | 115 |
| | Death rate per 1,000 - - - - - | 1.087 | 1.748 | 6.096 | 10.996 |
| XIV. | Brick, Cement— | | | | |
| | Years of life - - - - - | 1,962 | 1,569 | 1,164 | 570 |
| | Deaths - - - - - | 7 | 11 | 15 | 11 |
| | Death rate per 1,000 - - - - - | 3.565 | 7.010 | 12.886 | 19.298 |
| XIX. | Textiles— | | | | |
| | Years of life - - - - - | 8,463 | 6,420 | 4,905 | 2,838 |
| | Deaths - - - - - | 14 | 21 | 40 | 51 |
| | Death rate per 1,000 - - - - - | 1.654 | 3.271 | 8.154 | 17.970 |
| XXII. | General and Undefined Workers and all Labourers— | | | | |
| | Years of life - - - - - | 24,306 | 19,416 | 13,422 | 7,362 |
| | Deaths - - - - - | 91 | 153 | 233 | 254 |
| | Death rate per 1,000 - - - - - | 3.743 | 7.880 | 17.359 | 34.501 |

In addition to the foregoing I have extracted all the deaths of persons engaged in the iron industry which occurred in the Dennistoun Registration District of Glasgow, which includes the Royal Infirmary, for the year 1905. These comprise 90 deaths, of which 39 were due to diseases of the respiratory system, *i.e.*, 17 were due to phthisis, and 22 to other forms of respiratory disease.

Of the 17 phthisis deaths,

2 were iron drillers,
1 an iron worker,
1 an iron-slotting machinist,
2 were sheet-iron workers,
1 a steel smelter,

4 were engine fitters,
2 were iron-work labourers,
3 were engineers,
1 an iron polisher
—
17

Of the other respiratory diseases, including 15 pneumonia and pleuro-pneumonia, and 6 bronchitis,

4 were iron dressers,
1 a forge worker,
1 an iron turner,
4 were iron workers,
2 were iron puddlers,
1 a steel sawyer,

1 a furnace man,
1 an iron-work labourer,
5 were engineers' labourers,
2 were engine fitters.
—
22

It would seem to be reasonable to conclude from the foregoing facts that the metal workers in Glasgow do not suffer to any appreciable extent from fibrosis of the lungs, or from pneumonia induced or predisposed to by the inhalation of basic slag dust.

BRICK, CEMENT, GLASS, AND POTTERY WORKERS.

In this group, on the other hand, the death-rates from all diseases in the various age-groups save at 55-65 are considerably in excess of the rates of all males.

This increase is reflected in the rates from phthisis and other diseases of the lungs.

APPENDIX II.

STATISTICS furnished by DR. GULLAND as to the nature and extent of Phthisis among Stonemasons treated in the Royal Victoria Hospital, Edinburgh.

ROYAL VICTORIA HOSPITAL OUT-PATIENTS, includes ALL Masons attending during the last three years.

| No. in Records. | M. B. or H. | Age | Time off work. | Time ill. | Family History. | Kind of case. | T. B. | Result. | |
|-----------------------|----------------|-----------|-------------------|------------|----------------------|---------------------------|--|----------|-------------------|
| 12462 | - | H. | 46 | 2 ms. | 3 ys. | Good. | Mainly bronchitic - - | Not. ex. | In statu quo. |
| 12991 | - | H. | 30 | 2 ws. | 9 ms. | Good. | Advanced bilateral - - | " " | Not seen again. |
| 13031 | - | H. | 42 | Not noted. | 12 ms. | Good. | Early apical - - - | " " | Improved. |
| 13066 | - | B. | 42 | " " | 2 ys. | Good. | " " - - - | + | Only seen twice. |
| 13195 | - | H. | 18 | " " | Chest in R.H.S.c. | Good. | Advanced bilateral - | + | " " thrice. |
| 13228 | - | B. and H. | 62 | " " | Several ys. | Good. | Emphys. and bronchitis - | Not. ex. | " " once. |
| 13241 | - | H. | 47 | " " | 19 ms. | Good. | Medium bilateral - - | + | " " " |
| 13272 | - | H. | 43 | 3 ms. | 3 ys. | Good. | Apical cavities, advanced | + | " " " |
| 13316 | - | H. | 25 | 7 ms. | 4 ys. | Good. | Medium case - - - | ++ | Improved. |
| 13360 | - | H. | 42 | 3 ds. | 12 ms. | Good. | Very early left - - | Not ex. | Got worse. |
| 13398 | - | H. | 28 | w. | 18 ms. | Good. | Medium, T. 101° - - | " " | " " |
| 13421 | - | H. | 39 | 1 yr. | 18 ms. | Good. | Advanced, basal also on both sides. | ++ | Only seen thrice. |
| 13506 | - | H. | 26 | w. | 8 ws. | F. d. ph. | Fairly early apical - | Not ex. | Improved. |
| 13532 | - | H. | 44 | Not noted. | 2 ys. | F. was ma- son, no ph. | Very slight left apical - | — | Only seen once. |
| 13547 | - | H. | 35 | 2 ws. | 8 ms. | Good. | Very early apical - - | ++ | Improved. |
| 13567 | - | H. | 29 | 9 ms. | 9 ms. | B. d. ph. | Advanced bilateral - - | +++ | Only seen once. |
| 13693 | - | H. | 45 | w. | 18 ms. | Good. | Marked double apical - | +++ | Improved. |
| 13708 | - | H. | 52 | 6 ms. | 2 ys. | Good. | Medium, cavity l. apex - | + | Got worse. |
| 13771 | - | H. | 23 | 5 ws. | 6 ws. | B. has ph. | Very early - - - | Not ex. | Only seen once |
| 3788 | - | B. | 35 | 3 ws. | 4 ys. | Good. | Advanced bilateral - - | + | Died. |
| 13800 | - | H. | 37 | 10 ms. | 10 ms. | Good. | Equal apical - - - | Not ex. | In statu quo. |
| 13842 | - | H. | 50 | 12 ws. | 12 ms. | Good. | Advanced bilateral - - | " " | Improved. |
| 13848 | - | H. | 48 | 3 ds. | 12 ms. | Good. | " " T. 101° - - | " " | Died. |
| 13899 | - | H. | 20 | 9 ms. | 10 ms. | Good. | " " - - - | +++ | Only seen once. |
| 13907 (Perth) | - | H. | 44 | 1 mth. | Some ys. | Good. | " " - - - | Not ex. | " " " |
| 14093 (Portobello) | - | B. | 60 | 10 ms. | 10 ms. | Good. | Medium - - - | " " | In statu quo |
| 14115 | - | H. | 44 | 4 ms. | 2 ys. | Good. | Fairly early - - - | + | Improved. |
| 14291 | - | H. | 43 | 3 ms. | 3 ms. | Good. | Early - - - | + | In statu quo. |
| 14338 | - | B. | 66 | 6 ms. | 4 ys. | Good. | Medium - - - | + | Improved. |
| 14412 | - | H. | 39 | 7 ms. | 7 ms. | Good. | Early, T. 100° - - | Not ex. | Only seen once. |
| 14527 | - | H. | 43 | 2 ms. | 6 ms. | Good. | (?) Syphilitic - - - | — | Not phthisis. |

ROYAL VICTORIA HOSPITAL OUT-PATIENTS, etc.—*continued.*

| No. in Records. | M. B. or H. | Age. | Time off work. | Time ill. | Family history. | Kind of case. | T.B. | Result. | |
|--------------------|----------------|------|-------------------|-----------|--------------------|-------------------|---|---------|-----------------|
| 14582 | - | H. | 50 | 1 yr. | 1 mth. | Good. | Medium - - - - | Not ex. | Only seen once. |
| 14861 (Oban) | - | H. | 31 | 2 ys. | 2 ys | Good. | Marked apical, T. 99°8' - | " " | " " " |
| 14889 | - | H. | 44 | 1 wk. | 2 ws | Good. | Very early - - - - | " " | " " " |
| 14921 | - | H. | 59 | 3½ ys. | 3½ ys. | Good. | Old ph. w. emph. and bronch. | " " | Improved. |
| 15091 | - | H. | 45 | 5 ws. | 4 ms. | Good. | Marked rt. side, T. 99°4' | + | " |
| 15113 | - | H. | 52 | 8 ws. | 3 ms. | D. d. ph. | Well marked - - - - | ++ | " |
| 15135 | - | H. | 56 | 5 ms. | 2 ys. | Good. | " " - - - - | + | Died. |
| 15158 | - | H. | 44 | 8 ms. | 15 ms. | Good. | " " - - - - | ++ | Only seen once. |
| 15296 | - | H. | 39 | 2 ms. | 3 ms. | Good. | Emphys, marked, T.100° | + | " " twice. |
| 15353 | - | H. | 51 | w. | Doubtful | F. & B. d. ph. | Double apical, lt. base also | + | " " once. |
| 15369 | - | H. | 48 | 2 ys. | 2 ys. | Good. | Aortic stenosis - - - | Not ex. | " " " |
| 15452 | - | H. | 42 | 1 wk. | 4 ms. | Good. | Fairly early, abscess in neck tubercular | " " | Improved. |
| 15499 | - | H. | 42 | w. | 1 yr. | B. d. ph. (?) | Fairly early, T.99°6' - | + | Worse. |
| 15539 | - | H. | 39 | 3 ms. | 2 ys. | Good. | Medium, bronch. also - | — | Only seen once. |
| 15557 | - | H. | 45 | 8 ms. | 2 ms. | Good. | Fairly early - - - - | + | In statu quo. |
| 15666 | - | H. | 54 | 3 ms. | 10 ms. | Good. | Advanced, T.101° - - - | +++ | Worse. |
| 15885 | - | H. | 27 | 3 ws. | Some years | S. d. ph. | Marked, T.99° - - - | + | In statu quo. |
| 16010 (Country) | - | H. | 54 | 1 mth. | 2 ys. | Good. | Early - - - - | Not ex. | Only seen once. |
| 16047 | - | H. | 50 | w. | 5 ms. | Good. | Medium - - - - | " " | " " " |
| 16086 | - | H. | 52 | 3 ws. | 3 ws. | Good. | Well advanced - - - | + | Improved |
| 16101 | - | B. | 64 | 1 yr. | 5 ms. | W. d. ph. | " " - - - - | + | " |
| 16185 | - | B. | 28 | 1 mth. | 4 ys. | Good. | Very advanced - - - | Not ex. | Died. |

IN-PATIENTS—A few taken at random.

| | | | | | | | | | |
|-------------------|---|----|----|--------|-----------|--------------------------|------------------------|-----|------------------|
| Lountain | - | M. | 64 | 10 ws. | 2 ys. | Good. | Well marked - - - | +++ | Lost wt. |
| Heron | - | M. | 45 | 2 ys. | 2 ys. | Friend d. ph. | Very marked - - - | ++ | Improved. |
| Hamilton | - | M. | 26 | 6 ms. | 1 yr. | 5 years ago F. d. ph. | Bad rt. sided - - - | ++ | Worse. |
| Grant | - | M. | 36 | 6 ms. | 2½ ys. | B. mason d. ph. | Marked bilateral - - | ++ | Improved greatly |
| Fraser | - | M. | 33 | 3 ms. | Not noted | Good. | Fibrinous bronchitis - | — | In statu quo. |
| Fothering- ham | - | M. | 41 | 2 ms. | 2½ ys. | Good. | Early - - - - | +++ | Improved. |
| Dunbar | - | M. | 37 | 2 ms. | 3 ys. | Good. | Bad rt. sided - - - | +++ | Worse. |
| Dickson | - | H. | 36 | 4 ms. | 1½ yr. | F. d. ph. and 2 S. | Medium - - - - | + | Much improved. |
| Derrick | - | H. | 29 | 5 ms. | 6 ms. | Good. | Mainly left, medium - | + | Improved. |
| Burgess | - | H. | 30 | 7 ms. | 1½ yr. | Good. | Marked rt. sided - - | ++ | In statu quo. |
| Birsell | - | M. | 44 | 6 ms. | 1½ yr. | Good. | " bilateral - - - | + | " " " |
| Banks | - | H. | 39 | 7 ms. | 1 yr. | Good. | " rt. sided - - - | ++ | " " " |
| Baillie | - | H. | 32 | 5 ms. | 1½ yr. | Good. | Medium, mainly left - | + | Much improved. |

ABBREVIATIONS:—M. = mason; B. = builder; H. = hewer; ws. = weeks; ds. = days; ms. = months; ys. = years; w. = working; F. d. ph. = Father died of phthisis; not ex. = not examined; + = Tubercle bacilli found in sputum; ++ and +++ if in very large numbers; — = sputum examined, no bacilli found.

G. Lovell Gulland.

APPENDIX V.

LETTER from DR. BUCHAN, Medical Officer of Health, St. Helens's.

Medical Officer of Health's Department,
Town Hall, St. Helens,
February 6th, 1907.

DEAR SIR,—I herewith forward to you some figures I have been getting out with respect to certain diseases among the workers in certain trades in St. Helens, which may be of use to your Committee. Your Committee will note that the death rate from phthisis and

from bronchitis and pneumonia has been highest among the chemical workers of the town.—I am,

Yours faithfully,
JOHN J. BUCHAN,
Medical Officer of Health.

The Secretary, Industrial Diseases Committee,
Home Office, Whitehall,
London.

COUNTY BOROUGH OF ST. HELENS.

PHTHISIS.

Deaths among occupied males engaged in certain occupations and at certain age period.

| | Occupations. | Ages. | | | Totals. | |
|--|----------------------------|--------|-------|--------------------|---------|--------|
| | | 15-25. | 25-45 | 45-60 and over. | | |
| Mean Population 1903-1906. | Glass Blowers - - - - } | 3,080 | 2,660 | 810 | 6,550 | 28,950 |
| | Other Glassworkers - - - } | | | | | |
| | General Labourers - - - | 1,250 | 1,400 | 950 | 3,600 | |
| | Colliery Workers - - - | 1,690 | 3,100 | 1,170 | 5,960 | |
| | Chemical Workers - - - | 270 | 590 | 370 | 1,230 | |
| | Others - - - - - | 4,000 | 4,750 | 2,800 | 11,610 | |
| Death Rates per 1,000, per annum. | Glass Blowers - - - - } | ·65 | 2·08 | 2·77 | 1·52 | 1·34 |
| | Other Glassworkers - - - } | | | | | |
| | General Labourers - - - | ·80 | 1·78 | 2·10 | 1·53 | |
| | Colliery Workers - - - | ·03 | ·64 | 2·13 | ·84 | |
| | Chemical Workers - - - | ·00 | 2·11 | 2·70 | 1·81 | |
| | Others - - - - - | ·55 | 2·05 | 1·52 | 1·39 | |

APPENDIX VI.

LETTER from MR. ALLAN GREENWELL, A.M. I.C.E., in reply to certain questions addressed to him.

DEAR SIR,—I have received your letter of the 1st inst., and have much pleasure in replying to the question contained therein as follows:—

1. *The chemical composition of the hard freestone quarried in the neighbourhood of Edinburgh and used as the principal building stone in that city.*

The building stone principally used in Edinburgh is a carboniferous sandstone, a typical instance being the well-known Craigleith stone. The Craigleith stone consists of "fine quartz grains with a siliceous cement; slightly calcareous; occasional plates of mica." The following is an analysis:—

| | | |
|-------------------|---------|------|
| Silica | - - - - | 98·3 |
| Carbonate of Lime | - - - - | 1·1 |
| Iron Alumina | - - - - | 0·6 |

(Report with reference to the selection of stone for building the new Houses of Parliament, 1839).

2. *The character of the seams, whether thick or thin, and the character of the coal, and of the stone in immediate relation with the coal, in the following collieries which, I believe, are quite close to one another at St. Helens:—Havannah, Ashton's Green, Collin's Green, Bold Colliery, Whitecross Colliery, Southport Colliery.*

All of these, as you say, are in the St. Helens district. "St. Helens district has beneath several beds of inferior Delf coals; St. Helens Main coal, Four-feet-coal, Cannel, Ravenhead Main coal, Bastious Mine, Rushey Park coal, for steam and furnace purposes, Little Delf or Arley Mine, more bituminous than the above, softer and less bright, used chiefly for smithy purposes and for coking, the Haydock Higher Florida

coals, clean and durable and largely used on ocean steamers, as well as at the Cheshire Saltworks; the Florida Main seam.—(N.B.—These two seem to be the St. Helens Main coal and the Four-feet seam respectively.) The Little Delf of St. Helens is the Arley Main of Wigan, the Riley Mine of Bolton, the Dogshaw Mine of Bury, and the Fulleage Main coal of Barnsley. This is the lowest coal seam of the Middle coal measures, and is of great economic value."

("Analyses of British Coals and Coke," Greenwell and Elsdon, 1907.)

The thickness of the seams vary from the Cannel coal, 1 foot 6 inches, to the St. Helens Main coal, 9 feet ("Coalfields of Great Britain," Edward Hull, 1905). Associated with the coal measures are beds of impure siliceous stone containing carbonaceous and ferruginous matter, the amount of silica rising to upwards of 90 per cent. The highest percentage of silica is found in the Gannister beds. These beds, however, are confined to the lower coal measures which are not reached in the St. Helens district.

3. *The nature of the stone quarried in the immediate neighbourhood of Huddersfield.*

The stone quarried in the immediate vicinity of Huddersfield comes from: (1) the Lower Coal Measures. (2) The Millstone Grit, and is in each case highly siliceous, containing over 90 per cent. of silica.

If you require more detailed information please let me know, and I will do my best to meet your requirements.—I remain,

Yours very truly,
ALLAN GREENWELL.

APPENDIX VII.

FIGURES furnished by DR. E. DAVIES.

Swansea, March 20th, 1907.

DEAR SIR,—I fear you will be disappointed with the figures I am sending herewith, as I confess I am myself, the results being in the opposite direction from what was anticipated. I think the return will have to be altogether disregarded. I believe it is vitiated by the omission of deaths due to the scheduled diseases, owing to want of definiteness of the entries in regard to "occupations." Some few "labourers" were iden-

tified as employed in tinplate works on inquiry by the inspectors, whilst many others could not be identified at all, and had to be excluded.

I am, Dear Sir,
Faithfully yours,
EBEN DAVIES, M.O.H.

Frank Elliott, Esq.,
Home Office.

SWANSEA, 1901-05.

DEATHS OF MALE TINWORKERS FROM CERTAIN SPECIFIED DISEASES AT SUBJOINED AGES.

| Diseases. | At ages. | | | | | | | | Total. |
|----------------|----------|-------|-------|-------|-------|-------|-------|-----|--------|
| | 15-25 | 25-35 | 35-45 | 45-55 | 55-65 | 65-75 | 75-85 | 85- | |
| Phthisis - - - | 4 | 10 | 5 | 6 | — | — | — | — | 25 |

DISEASES OF HEART AND CIRCULATORY SYSTEM.

| | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|----|
| Pericarditis ; Endocarditis ; Valvular Disease. | — | 1 | 1 | — | 1 | 1 | 1 | — | 5 |
| Other Diseases ; Syncope - | — | — | 2 | 2 | 2 | 3 | — | — | 9 |
| Aneurysm - - - - | — | — | — | — | — | — | — | — | — |
| Angina pectoris - - - | — | — | — | — | — | — | — | — | — |
| Embolism ; Thrombosis - | — | — | — | — | — | — | — | — | — |
| Senile gangrene - - - | — | — | — | — | — | — | — | — | — |
| | — | 1 | 3 | 2 | 3 | 4 | 1 | — | 14 |

DISEASES OF ORGANS OF RESPIRATION.

| | | | | | | | | | |
|------------------------------|---|---|---|---|---|---|---|---|----|
| Laryngitis - - - - | — | — | — | — | — | — | — | — | — |
| Bronchitis - - - - | — | — | 1 | 1 | 2 | — | — | — | 4 |
| Pneumonia - - - - | 2 | — | 2 | — | 3 | 1 | — | — | 8 |
| Pleurisy - - - - | — | — | — | 1 | — | — | — | — | 1 |
| Asthma ; Emphysema - | — | — | — | — | — | — | — | — | — |
| Other respiratory diseases - | — | — | — | 1 | — | — | — | — | 1 |
| | 2 | — | 3 | 2 | 5 | 1 | — | — | 14 |

Total population Tinworkers (males) at Census - - - - - 2186
Phthisis deaths 25=5 annually=annual rate of mortality - - - - - 2·29 per 1,000
Heart diseases 14=2·8 annually=annual rate of mortality - - - - - 1·28 " "
Respiratory diseases 14=2·8 annually=annual rate of mortality - - - - - 1·28 " "

March 20th, 1907.

E. DAVIES.

APPENDIX VIII.

Statement by DR. H. MALET.

Health Offices, Red Lion Street,
Wolverhampton,
February 14th, 1907.

INDUSTRIAL DISEASES COMMITTEE.

DEAR SIR,—In accordance with the request of the Committee of Enquiry, held here on the 14th ultimo, I have tabulated the deaths registered as phthisis in this borough for the last five years and I enclose the table with some explanatory remarks.—I am,

Yours faithfully,
HENRY MALET,
Medical Officer of Health.

Frank Elliott, Esq.,
Secretary to the Industrial Diseases Committee,
Home Office, Whitehall, S.W.

Health Offices, Wolverhampton.

Memoranda re Phthisis Deaths.

Deaths have been registered under such various headings as phthisis, pulmonary phthisis, etc., without special mention of tubercle; all these I have classified as "phthisis" in the annexed table; returns made as pulmonary tuberculosis, tuberculosis of lungs, etc., I have classified as pulmonary tuberculosis. A very few returns have been made as consumption or pulmonary hæmorrhage; these are classified apart. During the five years, out of 443 deaths under the various phthisis headings, certified by from fifty to sixty different doctors, only one has been returned as fibroid phthisis:—George Chinn, age forty, of 5, Court, Swan Street (rather near large edge tool works where grinding

is done), died January 20th, 1906, certified by Dr. S. Poole, who gave evidence before the Parliamentary Committee here.

The east sub-district contains many factories, several large edge tool works where much grinding is done, and has mainly a working class population; its population is at present apparently on the decline. The west has a large proportion of residential property, and much more better class artisan property than the east, it is more open; it contains some factories, and grinding is done in many of them; lock, key and cycle for instance, but stone grinding only in a few. The west population is rapidly increasing, and at present the populations of the east and west sub-districts are as 2 to 3. The Census Returns give me no details of occupation such as would enable me to make even a guess at the number of persons engaged in grinding. This makes it difficult to draw any conclusion as to the effect of grinding on the phthisis returns. Our figures show male mortality greater than female, the difference increasing rapidly with age, but this increase is even more marked in phthisis definitely stated to be tubercular than in the other phthises, and would only imply that the conditions of males rendered them more liable to tubercle as age advances. Conditions such as greater exposure to sources of infection in workshops, and personal habits. Comparison with similar statistics from a non-grinding district might show something.

The comparison of the two sub-districts is interesting, but, in the absence of more definite information as to the numbers engaged in grinding, seems useless in reference to the present question; apparently there is more stone-grinding in the east, but much more total grinding, emery, etc.) in the west.

HENRY MALET,
Medical Officer of Health

COUNTY BOROUGH OF WOLVERHAMPTON.

DEATHS REGISTERED AS PHTHISIS, ETC., DURING FIVE YEARS.

| | | East Sub-district. | | | | | | | | West Sub-district. | | | | | | | |
|--------------------------------------|----|--------------------|----------|----------|----------|----------|----------|----|----------|--------------------|----------|----------|----------|----------|----------|----|----------|
| | | Males | | | | | | | | Males | | | | | | | |
| Population—Census 1901 | | 20,514 | | | | | | | | 25,799 | | | | | | | |
| | | Females | | | | | | | | Females | | | | | | | |
| | | 19,764 | | | | | | | | 28,110 | | | | | | | |
| | | Ages, years. | | | | | | | | Ages, years. | | | | | | | |
| Five years (1902-6). | | 15 | 15 to 25 | 25 to 35 | 35 to 45 | 45 to 55 | 55 to 65 | 65 | All ages | 15 | 15 to 25 | 25 to 35 | 35 to 45 | 45 to 55 | 55 to 65 | 65 | All ages |
| Phthisis | M. | 2 | 12 | 18 | 27 | 27 | 4 | — | 90 | 4 | 14 | 21 | 25 | 21 | 7 | 3 | 95 |
| | F. | 5 | 6 | 17 | 13 | 9 | 4 | — | 54 | 5 | 11 | 12 | 14 | 7 | 4 | 1 | 54 |
| Pulmonary Tuberculosis | M. | 2 | 3 | 11 | 17 | 8 | 8 | 1 | 50 | 4 | 6 | 13 | 7 | 11 | 1 | — | 42 |
| | F. | 3 | 7 | 7 | 4 | 2 | 2 | — | 25 | 4 | 4 | 9 | 8 | 1 | 1 | 1 | 28 |
| Consumption and Pulmonary Hæmorrhage | M. | — | — | — | — | 1 | — | — | 1 | — | 1 | 2 | — | — | — | — | 3 |
| | F. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Fibroid Phthisis | M. | — | — | — | 1 | — | — | — | 1 | — | — | — | — | — | — | — | — |
| | F. | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | M. | 4 | 15 | 29 | 45 | 36 | 12 | 1 | 142 | 8 | 21 | 36 | 32 | 32 | 8 | 3 | 140 |
| | F. | 8 | 13 | 24 | 17 | 11 | 6 | — | 79 | 9 | 15 | 21 | 22 | 8 | 5 | 2 | 82 |

APPENDIX IX.

SUPPLEMENTARY EVIDENCE OF PROFESSOR LINDSAY ON DISEASES OF FLAX-
WORKERS IN BELFAST.

1. Total number of flaxworkers.

The figure given by me to the Committee—60,000—is approximately correct for Belfast and district. For Belfast alone the figure is about 40,000.

2. Proportion of workers in the various departments.

| | | | | | |
|-----------------|---|---|---|---|--------------|
| Spinners | - | - | - | - | 35 per cent. |
| Doffers | - | - | - | - | 25 „ |
| Preparing hands | - | - | - | - | 7 „ |
| Carders | - | - | - | - | 2 „ |
| Reelers | - | - | - | - | 20 „ |
| Hacklers | - | - | - | - | 11 „ |

100

These figures are approximate. The number of the various classes is different in different mills.

3. Average ages of the workers in the various departments.

No statistics on this point are available. In general, the spinners are young and middle-aged women, the doffers are young women, the preparing hands, carders, and reelers are women of various ages, the hacklers are chiefly adult men, but boys are employed in machine hackling.

4. Total number of all intern patients in the Royal Victoria Hospital.

Annual average, 2,900 to 3,000.

5. Total number of flaxworkers treated in the Royal Victoria Hospital.

Annual average, 280 to 300, i.e., about 10 per cent. of the total.

6. Present population of Belfast.

360,000 to 370,000.

JAMES A. LINDSAY.

March 5th, 1907.

FLAXWORKERS SUFFERING from LUNG DISEASES and treated by Dr. ROBERT HALL in his WARDS in the BELFAST UNION INFIRMARY during the year 1906, giving AVERAGE AGE, etc.

MALES.

| Occupations. | Diseases. | | (In years) Ages range from | Number living, Bronchitis. | Average age. | Number living, Phthisis. | Average age. | Number dead, Bronchitis. | Average age. | Number dead, Phthisis. | Average age. |
|-----------------|-------------|-----------|----------------------------------|----------------------------------|-----------------|--------------------------------|-----------------|--------------------------------|-----------------|------------------------------|-----------------|
| | Bronchitis. | Phthisis. | | | | | | | | | |
| Weavers - - | 3 | 4 | 17 to 69 | 2 | 52½ | 3 | 33 | 1 | 69 | 1 | 17 |
| Roughers - - | 3 | 8 | 25 to 68 | 2 | 52½ | 4 | 35½ | 1 | 60 | 4 | 43 |
| Hacklers - - | 35 | 14 | 24 to 75 | 34 | 53½ | 4 | 44½ | 1 | 60 | 10 | 40 |
| Spinners - - | 2 | 1 | 16 to 68 | 1 | 55 | — | — | 1 | 68 | 1 | 16 |
| Drawers - - | — | 1 | 17 | — | — | 1 | 17 | — | — | — | — |
| Yarn Dressers - | — | 3 | 32 to 54 | — | — | 2 | 43 | — | — | 1 | 32 |
| Yarn Bundlers - | 1 | 5 | 29 to 40 | 1 | 29 | 5 | 33½ | — | — | — | — |
| Machine Boys - | — | 6 | 15 to 20 | — | — | — | 16 | — | — | 3 | 18½ |

FEMALES.

| | | | | | | | | | | | |
|---------------|----|----|----------|----|-----|----|-----|---|----|----|-----|
| Weavers - - | 9 | 21 | 16 to 60 | 8 | 46½ | 15 | 30½ | 1 | 56 | 6 | 28½ |
| Rovers - - | 3 | 13 | 18 to 52 | 3 | 43½ | 10 | 27¼ | — | — | 3 | 29½ |
| Spinners - - | 12 | 38 | 19 to 70 | 12 | 40 | 26 | 30 | — | — | 12 | 30½ |
| Doffers - - | — | 5 | 14 to 17 | — | — | 4 | 15½ | — | — | 1 | 14 |
| Drawers - - | — | 9 | 22 to 60 | — | — | 6 | 35½ | — | — | 3 | 46 |
| Reelers - - | 8 | 9 | 18 to 76 | 8 | 55 | 6 | 36 | — | — | 3 | 44½ |
| Preparers - - | 5 | 2 | 25 to 67 | 5 | 47 | 1 | 25 | — | — | 1 | 30 |
| Winders - - | 9 | 6 | 18 to 64 | 7 | 40 | 5 | 40 | 2 | 60 | 1 | 37 |
| Spreaders - - | 4 | 3 | 20 to 42 | 4 | 36½ | 2 | 31 | — | — | 1 | 28 |
| Carders - - | 2 | 3 | 25 to 52 | 2 | 29½ | 3 | 34½ | — | — | — | — |

APPENDIX X.

Statistics furnished by DR. G. PETGRAVE JOHNSON.

Feb. 21st, 1907.

Dear Sir,—

Since returning to Stoke I have been able to go more carefully into the statistics of deaths among potters' pressers. I find that during the seven years 1900-1906 of potters' pressers living in Stoke 47 died. Of these 14 died of bronchitis, 15 of phthisis, and 5 of pneumonia—i.e., over 72 per cent. of the deaths were due to lung diseases. If the deaths in the North Stafford Infirmary and the Stoke-upon-Trent Union Hospital are included, then 112 deaths among potters' pressers occurred in the same seven years. Of these 31 were due to bronchitis, 43 to phthisis, and 4 to pneumonia—i.e., 70 per cent. of the deaths were due to lung diseases. These figures are correct.

I find during the seven years 1900-1906, in not a single instance in any of the deaths amongst potters' pressers occurring in the N.S. Infirmary or in the Workhouse Hospital or in the Borough of Stoke, is fibroid phthisis or potters' asthma, or cirrhosis of the lungs, or fibroid pneumonia given as the cause of death.

Bronchitis, phthisis, pulmonary tuberculosis, pneumonia are the diseases of the lungs which are mentioned.

I should like to supplement what I wrote previously by stating that the changes in the lungs caused by the particles of dust progress very slowly, years passing during the development. Should tuberculosis of the lungs supervene, the man dies within a comparatively short time, and any lung changes due to dust do not attract attention. Should bronchitis develop, however, he survives for years, and latterly, in the intervals (if any) of comparative freedom from bronchitis, the lung changes due to dust may attract attention or may not. The bronchitic symptoms, however, always attract more attention.

I am, Sir, yours faithfully,

G. PETGRAVE JOHNSON.

The Chairman,
The Industrial Diseases Committee.

APPENDIX XI.

STATISTICS furnished by Dr. DAWES of Deaths from the chief Potters' Respiratory Diseases, from 1898-1906, in Longton, Staffordshire.

BRONCHITIS.

| Potters only. | Per cent of Total deaths from Bronchitis. | Total deaths from Bronchitis, including Potters. |
|---------------------|---|--|
| 168 | 19 | 870 |
| 1898 - - - 21 - - - | 22 | 1898 - - - 96 |
| 1899 - - - 26 - - - | 31 | 1899 - - - 83 |
| 1900 - - - 22 - - - | 23 | 1900 - - - 93 |
| 1901 - - - 19 - - - | 17 | 1901 - - - 109 |
| 1902 - - - 22 - - - | 17 | 1902 - - - 124 |
| 1903 - - - 12 - - - | 16 | 1903 - - - 76 |
| 1904 - - - 15 - - - | 18 | 1904 - - - 81 |
| 1905 - - - 19 - - - | 17 | 1905 - - - 108 |
| 1906 - - - 12 - - - | 12 | 1906 - - - 100 |

PHTHISIS, including FIBROID PHTHISIS.

| Potters onl | Per cent. of Total deaths from Phthisis. | Total deaths from Phthisis, including Potters. |
|---------------------|--|--|
| 197 | 44.3 | 449 |
| 1898 - - - 22 - - - | 63 | 1898 - - - 35 |
| 1899 - - - 26 - - - | 57 | 1899 - - - 45 |
| 1900 - - - 18 - - - | 34 | 1900 - - - 52 |
| 1901 - - - 22 - - - | 40 | 1901 - - - 54 |
| 1902 - - - 23 - - - | 41 | 1902 - - - 56 |
| 1903 - - - 23 - - - | 44 | 1903 - - - 52 |
| 1904 - - - 24 - - - | 44 | 1904 - - - 54 |
| 1905 - - - 14 - - - | 36 | 1905 - - - 39 |
| 1906 - - - 25 - - - | 40 | 1906 - - - 62 |

POTTERS' ASTHMA.

| Potters only. | Per cent. of Total deaths from Asthma. | Total deaths from Asthma, including Potters. |
|---------------|--|--|
| 56 | Over 90 | 62 |

APPENDIX XII.

STATISTICS furnished by DR. TATHAM.

TABLE I.—ENGLAND and WALES, 1900-1-2.—Comparative Mortality figure for Phthisis and Diseases of Respiratory System in certain specified occupations.

| OCCUPATION. | Phthisis and Diseases of the Respiratory System | | Phthisis. | Diseases of Respiratory System. |
|--|---|--------|-------------------|---------------------------------|
| | Mortality Figure. | Ratio. | Mortality Figure. | |
| Agriculturist - - - - - | 161 | 100 | 79 | 82 |
| Dock Labourer, Wharf Labourer - - - | 632 | 393 | 291 | 341 |
| Potter ; Earthenware, &c., Manufacture - - | 741 | 460 | 277 | 464 |
| Cutler ; Scissors Maker - - - - - | 812 | 504 | 516 | 296 |
| Tin Miner - - - - - | 1,577 | 980 | 838 | 739 |
| Nail, Anchor Chain, and other Iron and Steel Manufactures. | 493 | 306 | 182 | 311 |
| Stone, Slate—Quarrier - - - - - | 390 | 242 | 186 | 204 |
| Brass, Bronze, Manufacturer, Founder, Finisher, Worker. | 469 | 291 | 262 | 207 |
| Bricklayer, Mason, Builder - - - - - | 364 | 226 | 188 | 176 |

The Table is to be read thus :—Among a certain number of males aged 25-65 years in the general population, 1,000 deaths occurred during the years 1900-1-2 ; of these 1,000 deaths, 186 were due to Phthisis and 174 to Diseases of the Respiratory System. Among an equal number of Agriculturists living at the same ages there were 79 deaths from Phthisis and 82 from diseases of the Respiratory System. Among an equal number of Dock Labourers, 291 and 341 respectively, and so on.

JOHN TATHAM, M.D.

TABLE II.—COMPARATIVE MORTALITY OF MALES aged 25-65 Years in different Occupations, from All Causes and from Several Causes. "Occupied only," 1890-91-92, "Occupied only" and "Occupied and Retired," 1900-01-02.

| Reference Number. | Occupation. | All Causes. | CAUSES OF DEATH. | | | | | | | | | | | | | | | Plumbism. | Accident. | Suicide. | Other Causes. | | |
|-------------------|--|-------------------------|------------------|----------------|------------------|-------------|----------------|-------------------|--------------|-----------------------------|----------------------------|----------------|---------------------------------------|-------------------|-------------------|----------------|---------------------------------------|--------------|----------------|----------------|----------------|----------------|--------------------|
| | | | Influenza. | Alcoholism. | Rheumatic Fever. | Gout. | Cancer. | Phthisis. | Diabetes. | Diseases of Nervous System. | Valvular Disease of Heart. | Aneurysm. | Other Diseases of Circulatory System. | Bronchitis. | Pneumonia. | Pleurisy. | Other Diseases of Respiratory System. | | | | | Hernia. | Diseases of Liver. |
| 20-22 | All Males | 1,155 1,000 | 39 23 | 15 16 | 8 7 | 3 2 | 54 68 | 223 186 | 9 10 | 118 105 | 28 35 | 7 7 | 118 101 | 101 57 | 123 90 | 9 6 | 25 21 | 3 3 | 33 27 | 29 27 | 32 35 | 18 17 | 1 1 |
| | Occupied Males (England & Wales) | 1,102 925 | 38 23 | 15 16 | 8 7 | 3 2 | 51 63 | 214 175 | 8 9 | 95 78 | 27 33 | 6 7 | 112 95 | 101 53 | 122 87 | 8 6 | 24 19 | 3 3 | 32 25 | 29 26 | 31 32 | 17 16 | 1 1 |
| | Agriculturist as re- presented by 20-22 | 695 559 602 | 41 24 24 | 5 6 7 | 6 5 6 | 1 1 1 | 42 48 50 | 123 79 85 | 7 8 8 | 59 49 62 | 18 21 23 | 3 3 3 | 76 64 70 | 45 20 22 | 68 47 49 | 5 4 4 | 14 11 11 | 3 3 3 | 19 12 13 | 24 21 22 | 17 17 18 | 11 10 11 | 0 0 0 |
| 18 | Dock Labourer, Wharf Labourer. | 2,114 1,374 1,481 | 44 19 19 | 60 49 50 | 7 6 7 | 3 2 2 | 59 67 76 | 377 291 308 | 5 3 3 | 131 86 112 | 44 43 45 | 16 12 12 | 212 121 131 | 329 124 137 | 254 180 187 | 21 13 14 | 46 24 27 | 4 4 4 | 30 20 22 | 47 33 33 | 47 38 41 | 32 20 23 | 1 0 0 |
| | Potter, Earthenware &c., Manufacture. | 1,970 1,420 1,493 | 48 23 22 | 10 7 8 | 9 6 6 | 1 — — | 40 63 74 | 385 277 285 | 10 9 9 | 144 107 131 | 50 42 43 | 7 3 3 | 207 168 173 | 435 246 253 | 155 103 105 | 9 6 8 | 171 109 107 | 3 3 4 | 37 19 21 | 35 30 32 | 52 32 33 | 20 19 20 | 19 9 10 |
| 54A | Cutler, Scissors Maker. | 1,752 1,460 1,566 | 28 15 19 | 21 13 13 | 8 2 2 | — 2 2 | 65 72 72 | 442 516 533 | 9 4 4 | 105 103 139 | 37 54 61 | 4 6 8 | 151 139 146 | 305 126 132 | 237 124 136 | 14 4 4 | 42 42 43 | 7 — — | 32 17 22 | 29 30 29 | 40 42 51 | 24 20 21 | 4 — — |
| | Tin Miner | 1,628 2,169 2,131 | 14 27 25 | 4 — — | 5 7 6 | — — — | 58 68 69 | 586 838 816 | 9 7 7 | 115 81 87 | 23 25 24 | 10 — — | 76 142 130 | 166 199 206 | 123 86 81 | 26 14 13 | 120 440 441 | 11 7 6 | 33 7 12 | 15 13 12 | 34 55 50 | 19 19 18 | — — — |
| 58 | Nail, Anchor, Chain and Other Iron and Steel Manufactures. | 1,504 1,137 1,187 | 55 31 31 | 14 12 12 | 8 8 9 | 1 1 1 | 53 66 67 | 226 182 187 | 9 6 6 | 130 91 109 | 36 42 43 | 8 4 5 | 144 119 125 | 189 97 100 | 288 183 186 | 11 11 10 | 32 20 20 | 6 3 3 | 34 24 25 | 29 29 31 | 35 30 33 | 18 20 29 | 1 1 1 |
| | Stone, Slate— Quarrier. | 1,359 905 939 | 31 19 19 | 9 6 6 | 10 7 7 | 1 0 0 | 67 53 57 | 313 186 190 | 4 4 5 | 86 60 72 | 34 29 30 | 4 3 3 | 120 85 90 | 142 59 60 | 168 99 100 | 15 8 8 | 29 38 38 | 2 4 4 | 18 18 18 | 29 13 14 | 20 28 28 | 14 12 12 | — — — |
| 59E | Brass, Bronze, Mannu- facturer, Founder, Finisher, Worker. | 1,257 1,074 1,154 | 35 14 15 | 11 10 10 | 3 7 7 | 2 1 1 | 59 62 64 | 323 262 272 | 6 6 6 | 120 92 120 | 33 30 33 | 6 6 7 | 108 113 121 | 159 81 86 | 107 95 110 | 14 10 12 | 32 21 20 | 5 2 2 | 24 25 26 | 30 27 27 | 33 48 47 | 21 30 30 | — 1 1 |
| | Bricklayer, Mason, Builder. | 1,157 862 906 | 37 19 20 | 11 13 13 | 7 6 6 | 4 2 2 | 52 57 59 | 260 188 194 | 8 8 8 | 97 62 76 | 29 32 34 | 8 6 6 | 113 84 89 | 125 60 65 | 128 79 80 | 7 6 6 | 31 31 32 | 2 3 3 | 27 21 21 | 23 20 20 | 29 26 29 | 14 13 13 | 0 0 0 |

Note—The figures for 1890-91-92 (occupied only) are printed in Italic type, those for 1900-01-02 (occupied only) in Old Style type, and those for 1900-01-02 (occupied and retired) in Italic type.

JOHN TATHAM, M.D.

APPENDIX XIII.

LETTER from MR. GREGOR, Managing Director of the Graigola Merthyr Co., Ltd., Swansea.

The Graigola Merthyr Co., Ltd.
(Late Cory, Yeo and Co.),
Colliery Proprietors and Patent Fuel
Manufacturers.

Swansea, March 11th, 1907.

Frank Elliott, Esq.,

Home Office, Whitehall.

DEAR SIR,—I beg to acknowledge receipt of yours
of the 9th inst., with proof of my evidence.

Since appearing before the Commission I have
thought the whole matter over very fully, and have

consulted the representatives of the other works in
the port.

We have decided not to object to the whole of the
workmen being scheduled if the disease of pitch wart
and pitch blindness is clearly defined in such a manner
that there can be no doubt of the existence of the
disease when cases are brought before us.

Under these circumstances, it will not be necessary
for me to submit further evidence or to appear before
the Commission in London.

Yours truly,

S. L. GREGOR.

APPENDIX XIV.

TABLES handed in by Mr. Fitzmaurice, C.M.G.

TABLE No. 1.

LONDON COUNTY COUNCIL.—ENGINEERS' DEPARTMENT.

SUMMARY of ABSENCES through Sickness and Accidents.—Main Drainage Staff.

| | 1903. | 1904. | 1905. | 1906. |
|---------------------------------------|---|---|---|---|
| | Percentage of men employed or working time. | Percentage of men employed or working time. | Percentage of men employed or working time. | Percentage of men employed or working time. |
| Total number of men absent | 238 | 255 | 238 | 248 |
| Total number of absences | 296 | 332 | 304 | 312 |
| Total number of days absent | 5,396 | 5,895 | 5,089 | 5,955 |
| Ordinary cases of Sickness :— | | | | |
| Number of men absent | 197 | 222 | 196 | 197 |
| Number of absences | 254 | 298 | 262 | 259 |
| Number of days absent | 4,531 | 5,236 | 4,235 | 5,093 |
| | | | | |
| | Due to work. | Due to work. | Due to work. | Due to work. |
| | Percentage as above. | Percentage as above. | Percentage as above. | Percentage as above. |
| | | | | |
| | Not due to work. | Not due to work. | Not due to work. | Not due to work. |
| | Percentage as above. | Percentage as above. | Percentage as above. | Percentage as above. |
| | | | | |
| Absences through Accidents :— | | | | |
| Number of men absent | 26 | 21 | 27 | 37 |
| Number of absences | 27 | 22 | 27 | 39 |
| Number of days absent | 680 | 498 | 657 | 687 |

MEM.—The total number of the Main Drainage Working Staff during the four years above-mentioned has averaged, say, 920. The total number of working days per man per annum has been taken on an average as 338.

TABLE No. 2.

LONDON COUNTY COUNCIL.—ENGINEERS' DEPARTMENT.

SUMMARY of ABSENCES through Sickness (exclusive of Accidents).—Main Drainage Staff—arranged to show details under three heads :—

| | (A.) Staff of Sludge Vessels. | | | | (B.) Men working above ground. | | | | (C.) Men working below ground. | | | |
|--|-------------------------------|-------|-------|-------|--------------------------------|-------|-------|-------|--------------------------------|-------|-------|-------|
| | Sludge Vessels, 150. | | | | Men working above ground, 498. | | | | Men working below ground, 272. | | | |
| Total Number of Men employed, 920, working as follows :— | 1903. | 1904. | 1905. | 1906. | 1903. | 1904. | 1905. | 1906. | 1903. | 1904. | 1905. | 1906. |
| Number of men absent | 39 | 41 | 30 | 32 | 97 | 114 | 99 | 104 | 61 | 67 | 67 | 61 |
| Number of absences | 50 | 44 | 38 | 36 | 123 | 160 | 134 | 140 | 81 | 94 | 90 | 83 |
| Number of days absent | 942 | 605 | 552 | 487 | 1,916 | 2,912 | 2,435 | 3,282 | 1,673 | 1,719 | 1,248 | 1,324 |
| Number of men absent as percentage of total number employed. | 26·00 | 27·33 | 20·00 | 21·33 | 19·47 | 22·89 | 19·87 | 20·88 | 22·42 | 24·63 | 24·63 | 22·42 |
| Number of days absent as percentage of total working days | 1·85 | 1·19 | 1·08 | 0·96 | 1·13 | 1·72 | 1·44 | 1·94 | 1·81 | 1·86 | 1·35 | 1·44 |

LONDON COUNTY COUNCIL.—ENGINEERS' DEPARTMENT.

SUMMARY of ABSENCES through Accidents, Main Drainage Staff, arranged to show details under three heads:—
(A.) Staff of Sludge Vessels. (B.) Men working above ground. (C.) Men working below ground.

| Total number of men employed, 920, working as follows:— | Sludge Vessels 150. | | | | Men working above ground 498. | | | | Men working below ground 272. | | | |
|---|------------------------|------|------|------|----------------------------------|------|------|------|----------------------------------|------|------|------|
| | 1903 | 1904 | 1905 | 1906 | 1903 | 1904 | 1905 | 1906 | 1903 | 1904 | 1905 | 1906 |
| Accidents due to work:— | | | | | | | | | | | | |
| Number of men absent - | 6 | 2 | 7 | 4 | 17 | 14 | 15 | 20 | 3 | 5 | 5 | 13 |
| Number of absences - | 6 | 3 | 7 | 5 | 18 | 14 | 15 | 20 | 3 | 5 | 5 | 14 |
| Number of days absent - | 89 | 69 | 269 | 86 | 541 | 255 | 315 | 352 | 50 | 174 | 73 | 249 |
| Accidents not due to work:— | | | | | | | | | | | | |
| Number of men absent - | 3 | 3 | 1 | — | 6 | 5 | 6 | 10 | 6 | 4 | 8 | 4 |
| Number of absences - | 3 | 3 | 1 | — | 6 | 5 | 6 | 10 | 6 | 4 | 8 | 4 |
| Number of days absent - | 41 | 45 | 12 | — | 76 | 54 | 90 | 127 | 68 | 62 | 95 | 48 |
| Accidents due to work:— | | | | | | | | | | | | |
| Number of men absent as percentage of total number employed | 4.00 | 1.33 | 4.66 | 2.66 | 3.41 | 2.81 | 3.01 | 4.01 | 1.10 | 1.83 | 1.83 | 4.77 |
| Number of days absent as percentage of total working days | .17 | .13 | .53 | .16 | .32 | .15 | .18 | .20 | .05 | .18 | .07 | .27 |
| Accidents not due to work:— | | | | | | | | | | | | |
| Number of men absent as percentage of total number employed | 2.00 | 2.00 | .66 | — | 1.20 | 1.00 | 1.20 | 2.00 | 2.20 | 1.47 | 2.94 | 1.47 |
| Number of days absent as percentage of total working days | .08 | .08 | .02 | — | .04 | .03 | .05 | .07 | .05 | .06 | .10 | .05 |

TABLE No. 4.
LONDON COUNTY COUNCIL.—ENGINEERS' DEPARTMENT.
MAIN DRAINAGE STAFF.

LIST of DISEASES to which most of the ordinary cases of Sickness have been due.

| Diseases. | 1903. | | | | 1904. | | | | 1905. | | | | 1906. | | | |
|---|-------------------------|----------------------------------|----------------------|---|-------------------------|----------------------------------|----------------------|---|-------------------------|----------------------------------|----------------------|---|-------------------------|----------------------------------|----------------------|---|
| | Number of men affected. | Percentage of total number sick. | Number of days lost. | Percentage of total time lost through sickness. | Number of men affected. | Percentage of total number sick. | Number of days lost. | Percentage of total time lost through sickness. | Number of men affected. | Percentage of total number sick. | Number of days lost. | Percentage of total time lost through sickness. | Number of men affected. | Percentage of total number sick. | Number of days lost. | Percentage of total time lost through sickness. |
| Bronchitis - | 4 | 2·03 | 84 | 1·85 | 12 | 5·40 | 563 | 10·75 | 13 | 6·63 | 349 | 8·24 | 14 | 7·10 | 508 | 9·97 |
| Catarrh - | 55 | 27·91 | 738 | 16·28 | 56 | 25·22 | 705 | 13·46 | 40 | 20·40 | 553 | 13·05 | 45 | 22·84 | 536 | 10·52 |
| Diarrhoea - | 18 | 9·13 | 108 | 2·38 | 14 | 6·30 | 90 | 1·71 | 11 | 5·61 | 85 | 2·00 | 8 | 4·06 | 40 | ·78 |
| Scarlet Fever - | 1 | ·50 | 50 | 1·10 | — | — | — | — | — | — | — | — | 1 | ·50 | 38 | ·74 |
| Typhoid or Enteric Fever - | 1 | ·50 | 121 | 2·67 | 1 | ·45 | 58 | 1·10 | — | — | — | — | 1 | ·50 | 61 | 1·19 |
| Gout - | 8 | 4·06 | 296 | 6·53 | 10 | 4·50 | 230 | 4·39 | 10 | 5·10 | 147 | 3·47 | 7 | 3·55 | 168 | 3·29 |
| Influenza - | 33 | 16·75 | 634 | 13·99 | 32 | 14·41 | 520 | 9·93 | 31 | 15·81 | 573 | 13·53 | 44 | 22·33 | 699 | 13·72 |
| Lumbago - | 16 | 8·12 | 249 | 5·49 | 17 | 7·65 | 154 | 2·94 | 12 | 6·12 | 118 | 2·78 | 8 | 4·06 | 110 | 2·15 |
| Rheumatism - | 21 | 10·66 | 278 | 6·13 | 26 | 11·71 | 635 | 12·12 | 31 | 15·81 | 558 | 13·17 | 15 | 7·61 | 260 | 5·10 |
| Sciatica - | 4 | 2·03 | 71 | 1·56 | 6 | 2·70 | 176 | 3·36 | 3 | 1·53 | 76 | 1·79 | 7 | 3·55 | 117 | 2·29 |
| Tonsillitis - | 7 | 3·55 | 117 | 2·58 | 11 | 4·95 | 122 | 2·33 | 11 | 5·61 | 131 | 3·09 | 9 | 4·56 | 82 | 1·61 |
| <i>Mem.</i> —Total number of men absent and days lost through ordinary cases of sickness, as per Table No. 1. | 197 | | 4,531 | | 222 | | 5236 | | 196 | | 4,235 | | 197 | | 5,093 | |

APPENDIX XV.

Letter from Mr. H. ORBELL as to illness of men engaged in the removal of night-soil.

Dock, Wharf, Riverside, and General Workers'
Union of Great Britain and Ireland,
Registered Office, 425, Mile End Road,
London, E.

April 22nd, 1907.

Mr. Herbert Samuel, M.P.

Dear Sir,—

The result of my investigation into the dangerous conditions under which the night-soil men work is as follows, and which I wish to lay before you as evidence, to show the necessity of this work being scheduled under the Compensation Act as dangerous work.

There are about from twelve to fourteen thousand men employed in the above-named work (night-soil collecting) in 90 towns.

Accrington, Ashton-under-Lyne, Aston Manor, Barnsley, Barrow-in-Furness, Bath, Birkenhead, Birmingham, Blackburn, Bolton, Bournemouth, Bootle, Bradford, Brighton, Bristol, Burnley, Burton-on-Trent, Bury, Cambridge, Cardiff, Carlisle, Cheltenham, Chester, Colchester, Coventry, Croydon, Darlington, Darwen, Derby, Devonport, Dover, Dudley, Eastbourne, Exeter, Gateshead, Gloucester, Great Yarmouth, Grimsby, Halifax, Hanley, Hastings, Hornsey, Huddersfield, Hull, Ipswich, Jarrow, Keighley, Leeds, Leicester, Leyton, Lincoln, Liverpool, Longton, Macclesfield, Manchester, Merthyr Tydfil, Middlesbrough, Newcastle-on-Tyne, Newport, Northampton, Norwich, Oldham, Oxford, Plymouth, Portsmouth, Preston, Reading, Rochdale, Rotherham, Salford, Scarborough, Sheffield, Smethwick, Southport, South Shields, Southampton, St. Helens, Stockport, Stockton-on-Tees, Sunderland, Swansea, Tottenham, Tyne-mouth, Wakefield, Walsall, Walthamstow, West Bromwich, Warrington, West Ham, West Hartlepool, Wigan, Wolverhampton, Worcester, Willesden, York, Ystradefydwg (Rhondda), Nottingham.

The work of collecting and disposing of night-soil in the above-named towns does not only expose the workmen to great risks to their health, but also to the general public. The nature of the work is as follows:—The men after 12 o'clock at night enter the backyards and remove the sanitary pans and empty the contents into open carts in the street. This method chiefly applies to Middlesbrough, where most of the houses have an entrance to the yard from the back. In some other towns they work on what is known as the duplicate system, viz., removing the full pan and substituting a clean one. There are 14 towns covered by about 2,500 men who have adopted the duplicate system.

In Hull, the method of collecting night-soil is most dangerous and offensive, both to the workmen employed and the occupants of the houses from which they collect. Most of the houses in Hull, where the sanitary pan system is in practice, there are no back entrances. The only way of getting to the privies and middens is through the house, and it must be collected between the hours of 6.30 and 8.30 a.m. These night-soil collectors come right through the living rooms into the yard, where they fill the "stuff muck," as they call it locally, into a tub, which is hoisted on the head of one of the men and then carried through the same living rooms, often when the family are at breakfast, and then tipped into an open cart in the street. The whole thing is horrible beyond description, and dangerous alike to the men who do the work and the community in general.

In other towns where there are what are known as pan closets, the work is done during the night, commencing about 12 p.m. and finishing about 7 a.m. Under this system the duty of the men is to haul the pans out of the privies, whence they are carried down the back passage and tipped into carts. The refuse is subsequently removed to a destructor, or to barges to be taken out to sea. In some cases there are mid-

dens into which falls all the refuse from the privies and the usual household refuse, ashes, etc. Where these middens exist the work has to be done under conditions too horrible and loathsome to be described. Suffice it to say that men have to stand in 12 to 18 inches of foul water in a hole 8 to 10 feet wide, and throw out the foul-smelling stuff through a small trap-door into a wheelbarrow, from which it is again filled into a cart.

The night-soil collector is in constant danger of contracting diseases, especially when collecting from those houses where there are sicknesses, as the whole of the refuse from the sick room, including poultices and lotion bandages, are deposited in sanitary pans, middens, or ash-pits as they are sometimes called.

The principal diseases from which these night-soil men suffer are erysipelas, typhoid, eczema, blood poisoning, and similar diseases. In the case of blood poisoning it very often happens as the men are removing the pans they knock their hands, it being dark, and the space is very limited; one can very easily understand how a man is apt to knock himself under such circumstances. The filth that he is handling gets into the wound, and thus blood poisoning sets in. Again, I know of cases where that part of the man's flesh which is exposed, he has scratched it, and so conveyed the poison to his blood in that way.

I here quote a few cases from Middlesbrough.

The first one is —, suffering from erysipelas, from the beginning of September, attended to by Dr. L—, who was of opinion that he had contracted the disease whilst following his employment as a night-soil man. The doctor's grounds for forming this opinion were that in cases of this disease rags soaked in lotion are usually laid on the affected parts, and are constantly changed and the old ones are thrown into the sanitary pan, and in dealing with the refuse the man is liable to touch one of these rags, the least contact with which would suffice to communicate the disease.

Another case is that of —, who was at the time of investigation in the sanatorium, suffering from typhoid fever. Very strong evidence goes to show he contracted this fever in the discharge of his duty.

Another case is —, who died in the sanatorium from typhoid, definitely stated, "contracted in the course of his employment."

I was told of a case in Middlesbrough of one of the men who conveyed the disease of typhoid home to his house, and he and his family were taken to the sanatorium.

I am only sorry I cannot get permission from the victims themselves to use their names as evidence. The reasons they give for forbidding that privilege, that it would become known to those in authority and the chances would be that they would be dismissed.

If you would pardon me for making a suggestion, which, in my opinion, would tend to check the spreading of diseases by this work, or in any case would stop the conveying of the disease to the homes of these workers, I suggest as follows:—That the men employed by a corporation or contractor should be provided with indiarubber gloves, which would not hamper them in the execution of their duty, and would certainly prevent the breaking of the skin should they knock their hands, and also they should be found the necessary clothing which could be changed when they leave their work at the depot, where they are booked on, and at a very small outlay the necessary baths could be erected at the depot, which would enable the men to change their clothing and bath themselves, putting on their ordinary clothing before they return to their homes. This, at any rate, in my opinion, would prevent the conveying of the diseases home to their wife and family.—Yours sincerely,

H. ORBELL.

APPENDIX XVI.

Letter from DR. DINGLE.

The Health Department,
Municipal Buildings, Middlesbrough,
May 3rd, 1907.

Mr. Herbert Samuel, M.P.

Dear Sir,—I have made inquiries into the statements contained in the letter of Mr. H. Orbell to the Industrial Diseases Committee relating to the danger of scavengers contracting infectious diseases.

As the names of the men engaged in collecting nightsoil in this town, who are stated to have suffered from typhoid fever and erysipelas, are not given, I have found it very difficult to trace the cases.

The first case quoted, that of a man named ———, engaged under the Corporation in collecting nightsoil, was notified to me as suffering from erysipelas in September last. He had erysipelas of the face.

The second case was a man named ———. He was admitted into the sanatorium, having been notified to me as a case of continued fever. This man was a driver of a nightsoil cart, and his duty was to stand at the head of his horse and to drive it; he did not handle the pans.

The third case, that of a man who died at the sanatorium, is probably a man also named ———, a brother of the above. He was admitted into the sanatorium in February, 1902, and died in the hospital.

I have no knowledge of the man and his family, who are stated to have been removed to the sanatorium.

Probably there is some mistake about this, as at the time ——— was admitted, in December last (*vide* case No. 2), there was another man, named ———, and his wife in hospital with typhoid, but this man was no relation, and did not live in the same locality or work for the Corporation.

The foreman of the men informs me that, so far as is known, three of the men employed collecting nightsoil have died from typhoid fever during the past 30 years—one (by name ———) about 30 years ago, another (——) about 15 years ago, and ——— 5 years ago.

Several of the men have suffered from injuries to the hands, knees, and feet, owing to working in the dark.

There is a total of 40 men employed collecting nightsoil, and 34 men driving nightsoil carts. I do not consider that the men employed collecting nightsoil are particularly subject to typhoid fever, and I have been somewhat surprised at the immunity experienced by workers in sewers and nightsoil.

The injuries to hands, feet, and knees are not of a serious nature, and it is only exceptionally that erysipelas or cellulitis supervenes, and then probably due to want of care and cleanliness on the part of the injured man.

Yours faithfully,
CHARLES V. DINGLE,
Medical Officer of Health.

APPENDIX XVII.

Letter relating to Poisoning by African Boxwood from the CURATOR OF
THE PHARMACEUTICAL SOCIETY.

Pharmaceutical Society of Great Britain,
17, Bloomsbury Square,
London, W.C., March 28th, 1907.

DEAR SIR,—In reply to your inquiry I was chiefly interested in ascertaining the botanical source of the wood, and thought that the chemical investigation of it might throw some light upon the point. I found, however, that soon afterwards Professor Harvey Gibson, of Liverpool, had undertaken the investigation of what I presumed was the same poisonous wood, and it is only now that I find he was working with a different wood altogether. The amount of the wood I was able to obtain was insufficient for an accurate chemical examination, and I fear I can throw no light upon the subject, except that the irritant substance that causes dermatitis does not, so far as I can learn, affect all workers alike. There are a number of people with extra-sensitive skin who are quickly affected by plants of the natural order *Anacardiaceae*, such as *Rhus Toxicodendron* and *Anacardium occidentale*, as well as by such plants as *Primula obconica*, a plant commonly cultivated in greenhouses. Such sensitives can usually be detected by the effect of a flea-

bite, which causes a painful and irritable swelling about the size of a lentil or split pea. Such persons should never be employed to saw or turn woods that contain irritating substances. These irritating principles vary in composition. In *Anacardiaceae* it is a volatile acid, or a substance known as cardol, in *Primula obconica*, a resinous body, and so on. With respect to the satin wood, all that I can tell you is, that the wood of the South African satin wood is at present under chemical investigation by a clever analyst, Mr. E. F. Harrison, B.Sc. (Lond.), F.I.C., F.C.S., 55, Chancery Lane, W.C. Yesterday I tasted some of the crystals, which under a good lens, can be seen on the wood, and found hardly any effect, just a faint acid sensation, but nothing more. I think it may therefore be taken for granted that the dermatitis is produced only in certain persons who have what doctors call an idiosyncrasy in respect to it, who belong to a class of persons with peculiarly sensitive skins. With respect to the wood examined and reported on by Professor Harvey Gibson in the "Bio-Chemical Journal" (Vol. I., p. 39-52, 1906), the poisonous and dangerous effects on the heart indicate that it was a totally different wood, although coming from the same district in

South Africa. I believe that he was mistaken in referring it to the plant he did, viz., *Sarcocephalus Diderichii*, as, in fact, he himself subsequently acknowledged. I believe it to have been the South African boxwood, the *Gonioma Kamassi*, which belongs to the natural order *Apocynaceae*, a family that contains many heart poisons. This wood has been examined by Mr. E. F. Harrison, who has found two crystalline principles in it. The difficulty that attends all inquiries of this kind is the confusion that exists between the names applied to different timbers, and the effects made by importers to conceal the names of the ports and country from which they are imported. The question of compensation will therefore have to be dealt with on broad lines, since there are many poisonous woods already in commerce producing different poisonous effects. The South African Boxwood, *Gonioma Kamassi*, is likely to produce its ill-effects on all workers in it, those with a strong heart

only suffering a little less than others. Of course, when trees are sawn up in the open air the workers take care to keep to windward, and so do not suffer, but in manufactories this can only be imitated in the same way as is done in Yorkshire with the anthrax infected wool, i.e., by causing a current of air to carry the dust into a furnace away from the worker. Any further information that I may be able to give I shall be pleased to communicate in a personal interview after Easter Monday, if you wish.—I am, dear Sir, yours faithfully,

E. M. HOLMES, F.L.S.

Curator, Pharmaceutical Society.

The Secretary,
Industrial Diseases Committee,
Home Office.

APPENDIX XVIII.

Letter from MR. STEADMAN, M.P.

The Trades Union Congress
Parliamentary Committee,
42-44, Effingham House,
Arundel Street, Strand,
London, W.C., 26th March, 1907.

Dear Mr. Elliott,—I regret to say that at the present time I am unable to give you any names of persons who could give evidence before your Committee on the subject of Asbestos, as I know of no Union connected with that industry. In the meantime I am making inquiries, and should I discover anyone capable of giving evidence on this matter I will at once let you know.

Yours faithfully,

W. C. STEADMAN.

APPENDIX XIX.

Letter from MR. MARCH.

The London Carmen's Trade Union
(Reg. No. 508).

Registered Office:

54, Minorities, E.C.

April 9th, 1907.

The Secretary of State for the Home Department,
re Industrial Diseases Committee.

Dear Sir,—In answer to your letter of the 8th inst. I am sorry to say that we are not in possession of any medical or veterinary surgeons' evidence on the matter* referred to in your letter.

I am, yours respectfully,

S. MARCH, Gen. Sec.

* "Mange" or "Duke."

APPENDIX XX.

Letter from DR. McDOUGALL as to absence of illness among men employed on cyanide plants.

Runcorn, Cheshire,

April 26, 1907.

Dear Sir,

In reply to your letter of the 20th inst., I write to say that I have no personal experience of the effect of working a cyanide plant, for although the cyanide plant here—which is not a very large one—has been in existence for a few years, no case of disease or injury to the workmen employed upon it has come under my notice, and I feel sure that if there had been any case of disease or damage to a workman,

such a case would get known to me either directly or indirectly, as I am in constant touch with all the chemical works here, and visiting them frequently, besides seeing them in a professional capacity, and in my capacity as factory surgeon any mishap to a workman from such a cause would I think come under my notice.

Yours faithfully,

F. McDOUGALL.

Frank Elliott, Esq.

APPENDIX XXI.

Report of DR. WALTER MALDEN
on the blood changes brought about by Nitro- and Amido-derivatives of Benzene.

At the request of the Home Office Committee on Industrial Diseases, I visited Bradford and Huddersfield in January and examined the men engaged in anilin black dyeing in the former, and the manufacture of nitrobenzene derivatives in the latter town, in order to report on the changes produced in the blood by constant exposure to these substances.

It has long been known that cases of poisoning occurred in men working at these trades; occasionally lives have been lost; frequently men have been obliged to leave their work for longer or shorter periods; and very frequently slight cases of poisoning have occurred which, though not severe enough to prevent the men from working, yet have occasioned discomfort and some suffering.

As will be seen from the accompanying charts, the following points were noted in every case examined:—

(1) The man's age, (2) length of employment, (3) number of times off work from illness due to trade; general appearance as indicated by (4) cyanosis and (5) conjunctival pallor. Examination of blood included (6) spectrum analysis, (7) estimation of specific gravity, (8) counts of both red and (9) white corpuscles per cmm., (10) differential percentage count of the different kinds of leucocytes by means of stained films, and (11), by the same means, examination of the physical condition of the red corpuscles. Estimation of the percentage of hæmoglobin by colour tests was also made, but the results were valueless, as explained later on, and have not been tabulated. All the compounds of the nitrobenzene series act on the blood in the same way, but some are much more toxic than others. In the works from which my cases were taken, the manufacture of di-nitro-benzol has caused the greatest number of cases of poisoning that has occurred, and seems to be the most toxic of all these compounds, while anilin hydrochloride used in black dyeing seems to be much less so.

These bodies may be absorbed either by (1) inhalation of their vapours, (2) through the skin, (3) by the alimentary canal. They appear to act on the blood in the same way no matter how they are absorbed; although probably inhalation of vapour is the commonest way since cases of poisoning are much more frequent in hot close weather than during the colder seasons of the year.

They first convert the oxy-hæmoglobin of the red corpuscles into met-hæmoglobin, and then hæmolyse them, causing degeneration of the cytoplasm and escape of the hæmoglobin into the plasma.

If the amount of met-hæmoglobin present in the blood at any given time is not excessive, it appears to be quickly removed by the liver, the iron being used for the production of fresh hæmoglobin, and the colouring matter excreted by the kidneys as free urobilin.

If the amount of poison absorbed is considerable and much hæmolysis has occurred, the liver becomes unable to remove all the hæmoglobin present in the blood plasma, and the condition of hæmoglobinæmia is established; this is manifested by the hæmoglobinuria which follows.

If a considerable amount of met-hæmoglobin is present in the blood, the respiratory capacity of the red corpuscles is diminished, the patient becomes cyanosed and the colour of the blood is changed to a chocolate brown. This fact renders the estimation of hæmoglobin in these cases by the ordinary colour standards impossible, as they are based upon the colour of pure oxy-hæmoglobin, which is quite different from that of met-hæmoglobin.

Of the three charts accompanying this report, the first gives tabulated information of the blood condition in anilin dye workers. The second gives similar information in nitrobenzene workers. The third gives the results of experimental anilin poisoning in the rabbit.

The anilin dyers examined were selected on account of their being engaged in those processes which seemed most likely to lead to poisoning. Two of the cases were men who were off work in consequence of having been recently poisoned (Nos. 6 and 13). It will be noticed that of the 13 men examined none had been employed for less than one year, the longest time being 15 years. Of these 13 men eight had never been off work at any time, but all had suffered at some time or other from some symptoms of anilin poisoning, those most frequently complained of being headache, drowsiness, nausea, want of appetite, shortness of breath, palpitation, and tingling sensations in the feet and legs.

I noticed in both the factories from which the cases were taken that there was evidence of anilin vapour being present in the atmosphere.

All the unpainted deal woodwork was stained a bright yellow colour, and I was informed that this was due to anilin fumes in the air. I tested this statement in the laboratory and found it to be an undoubted fact that unpainted deal becomes quickly stained yellow in the presence of even very small amounts of anilin vapour, thus constituting a very delicate test for detecting its presence in the air. (Specimens of wood exposed to anilin vapour accompany this report.)

In every case the blood was examined spectroscopically, but in no case was the spectrum of met-hæmoglobin found to be present, nor were any of the men cyanosed. I found by subsequent experiment that the met-hæmoglobin band could not be detected unless that substance was present in at least the proportion of 1 to 10 of oxy-hæmoglobin; thus this substance was present in less than this proportion in the men examined. The specific gravity of the blood was taken in every case and the percentage of hæmoglobin calculated from it by means of Hammerschlag's table, this being the only available method of estimating it, and one which gives fairly accurate results; from this the colour index was determined.

The number of red corpuscles and leucocytes per cmm. was counted in every case, and a differential percentage count of the leucocytes made from stained films.

Among the anilin dyers the evidence of blood destruction was not very apparent from the blood counts. It will be seen from Chart No. 1 that 6 out of the 13 cases examined had more than the normal number of red corpuscles per cmm., the highest being 5,600,000 and the lowest 4,400,000. In all probability the effect of absorbing small doses of anilin daily is to stimulate the production of red corpuscles by the bone marrow, so that destruction is counterbalanced by renovation. Evidence of this was supplied by the low colour index and imperfect development of the corpuscles.

None of the men showed signs of cyanosis at the time of examination, but nine of them showed conjunctival pallor. The specific gravity of their blood showed that there was a decrease in hæmoglobin of from 5 to 50 per cent. The colour index of all the cases examined was with one exception below unity. The number of leucocytes per cmm. did not show any great departure from the normal; 8 were above the average and 5 below. The highest was 12,000 and the lowest 4,000 per cmm.

Examination of the stained blood films gave the most important indication of degeneration in the red corpuscles. In most of the cases the variation in size of the red corpuscles was considerable, ranging from 5 μ , the larger sizes being the most numerous. None showed any poikilocytosis, but 6 out of the 13 showed basophil granulations in the red corpuscles. The number of cells affected varied from 2 or 3 in the whole film in the slight cases to 10 or 12 in every field of the microscope in the more pronounced ones. I attach great importance to this reaction, because I

believe it to be in anilin poisoning, as it is in lead poisoning, the earliest recognisable sign in the blood. No nucleated red corpuscles were found in any case, nor any pathological leucocytes. The differential percentage leucocyte count showed a departure from the normal in several cases. The number of polymorphonuclear cells showed a decrease in 9 out of 13 cases, the decrease being considerable in cases 1, 2, 5, 8, and 9. There was a corresponding increase in the number of lymphocytes, amounting in 3 cases (Nos. 2, 8, and 9) to a moderate lymphocytosis. The other cellular elements did not show any marked departure from the normal.

Chart II. records the results of a blood examination in men engaged in the manufacture of di-nitro-benzol. All the hands employed were examined, as this substance is generally believed to be the most poisonous of the nitrobenzene series.

I was informed that for the last few months the men engaged in these particular works had been constantly shifted, so that they were never employed in the di-nitro-benzol department for more than a week or two at a time, in consequence of the number of cases of poisoning which had occurred.

It will be noticed that the average length of employment is considerably shorter in the nitrobenzene workers than in the anilin dyers. Five of the 21 cases examined had been employed for one week or less, while only four had been employed for more than one year. This is no doubt owing to the dangerous nature of the trade; very few workers escape poisoning at some time or other, and so do not care to remain long at it.

Excluding the five men who had been employed for one week or less, 11 out of the remaining 16 had been off work at least once in consequence of being poisoned. All the men, including those who had not left their work, had suffered from some symptoms of poisoning, such as headache, drowsiness, loss of appetite, nausea, shortness of breath, palpitation, cyanosis, and pains in the legs.

In analysing the cases recorded in Chart II., Nos. 19 and 35 had only been employed for one day, and therefore serve as control cases for purposes of comparison with the others, their blood being quite normal. Of the other 19 cases, 13 showed some degree of cyanosis; in most of them it was slight, and confined to the lips, but in cases 33 and 34 it was well marked. Most of the men had conjunctival pallor, the exceptions being those employed for one week or less, Nos. 16, 18, 19, 20, and 35. The specific gravity of the men's blood was below the normal, except in the five previously-mentioned cases.

The colour index was in most cases normal, or nearly so, this being probably due to the fact that blood destruction was unaccompanied by regeneration.

The number of red corpuscles per cmm. was normal in only five cases, these again being men who had only been employed for a very short time. Most cases had from 4 to 4½ million per cmm., while three were below 4 million; the lowest was 3,600,000. The leucocyte count varied from 4,000 to 21,000 per cmm., eight being above 10,000, five below 7,000, the rest between these figures.

The differential percentage leucocyte count showed the same features as Chart I.

Thirteen of the 21 cases showed a decrease in the number of polymorphonuclears, and a corresponding increase in the lymphocytes. It will be observed that in cases 18, 20, and 34, men who had only been working for a short time, there was already a considerable decrease in the polymorphonuclears. In four cases (Nos. 17, 28, 32, and 33) there was a marked increase in the number of eosinophils, but these cases do not appear to bear any relation to those in which there was a decrease in polymorphonuclears. The other cellular elements were present in normal, or nearly normal, proportions. No myelocytes were seen in any case; only in three were there any nucleated red corpuscles found, and these in very scanty numbers.

The red corpuscles varied very much in size, from 3 μ to 12 μ , the larger sizes being the most common. In cases 18 and 32 some poikilocytes were found. In 17 of the 21 cases basophil granulations were present in the red corpuscles, three exceptions being men who had been employed less than a week. In some cases they were few in number, while in others, noticeably in Nos. 33 and 34, the affected cells were very numerous, as many as 20 being present in every field of the microscope.

It will be noticed that cases 16 and 18 were men who had been working for only one week, and whose red corpuscles were normal in number, yet showed a distinct basophil reaction, emphasising the fact that this is the earliest detectable blood sign in nitro-benzol, as in anilin poisoning.

Spectroscopic examination showed only the oxy-hæmoglobin bands in 19 cases, while in two (Nos. 33 and 34) a faint band in the red showed the presence of met-hæmoglobin.

Chart III. gives the results of experimental anilin poisoning in a rabbit. The dose of anilin injected was small, so as to reproduce as nearly as possible the conditions to which the men working with this substance are subjected. The animal was given eight subcutaneous injections in 12 days, the initial dose being .1 cc. of anilin hydrochloride; this was increased to .2 cc. on the fifth day, and to .3 cc. on the sixth and following days. On the last two days of the experiment the animal was placed in a chamber containing anilin vapour for half an hour.

The observations made on the blood during the course of the experiment corresponded closely with those made on the blood of anilin dyers and nitrobenzene workers.

There was a constant and progressive fall in the specific gravity of the blood. For the first 10 days the oxy-hæmoglobin bands were the only ones visible spectroscopically. On the eleventh day the met-hæmoglobin band was seen, and remained visible until the animal was killed. The red corpuscles showed a continuous decrease in number, rapid at first, but slower later on. The number of leucocytes increased for the first six days from 7,000 to 19,000 per cmm., and after that gradually fell.

The differential leucocyte percentage count showed an almost continuous and progressive decrease in the number of polymorphonuclears, with a corresponding increase in the number of lymphocytes. The large mononuclears increased in numbers up to the sixth day, and after that decreased. The other cells did not differ from the normal in numbers.

On the eighth day of the experiment polymorphonuclear myelocytes were found to be present in the blood, and continued in increasing numbers until the animal was killed.

At no time were many basophil red corpuscles found, but on the fourth day polychromasia was present, and continued to increase, until on the last day of the experiment there were as many cells showing this change as there were normal red corpuscles. This change in the rabbit's corpuscles corresponds to the occurrence of basophil granulations in human corpuscles. Poikilocytes were also present during the last six days of the animal's life. On the sixth day nucleated red cells were seen, and continued in increasing numbers until the last day of the experiment, when they were present in very large numbers.

The results of this experiment, therefore, fully confirm the findings in the blood of anilin and nitrobenzene workers, which may be summarised as follows:

- (1) Decrease in the amount of hæmoglobin, as shown by the decrease in specific gravity of the blood, from 5 to 50 per cent.
- (2) Decrease in the number of red corpuscles in severe cases.
- (3) Degeneration of the red corpuscles, as shown by the occurrence of basophil granulations, polychromasia, poikilocytosis, and variations in size.
- (4) Presence of nucleated red corpuscles in severe cases.
- (5) A moderate leucocytosis at a certain stage in the course of the case.
- (6) Decrease in the percentage of polymorphonuclears, and a corresponding increase in that of the lymphocytes.
- (7) The occurrence of met-hæmoglobin in the blood, which, however, cannot be detected spectroscopically until the amount present is equal to one-tenth of the total volume of blood.

The simultaneous occurrence of all or several of these phenomena in the blood of a person engaged in anilin dyeing or the manufacture of nitrobenzene and its derivatives renders easy the detection of even slight cases of poisoning by these substances.

There are other signs and symptoms which accompany the blood changes. These are cyanosis, dilata-

tion of the right side of the heart, increased frequency of the heart's action, dyspnœa, drowsiness, headache.

The urinary signs do not come within the scope of this report, but may be of considerable value in arriving at a diagnosis of anilin and nitrobenzene poisoning. They include the presence of free urobilin in the less severe cases, and of hæmoglobinuria in the more severe ones. In very acute cases of poisoning by di-nitro-benzol that body can be detected in the urine.

In case of acute poisoning the best treatment seems to be inhalation of oxygen, which will keep the patient alive even when the greater part of his blood is met-hæmoglobinised. Haldane found that mice could be kept alive in oxygen at a pressure of two atmospheres when 90 per cent. of their oxy-hæmoglobin had been converted to met-hæmoglobin by the injection of sodium nitrite.

In the less severe cases removal from contact with the poison for a time restores the patient to health, as the met-hæmoglobin and degenerated corpuscles are quickly removed from the circulation and fresh red corpuscles are developed in the bone marrow to take the place of those that have been lost.

The main conclusion arrived at may be briefly recapitulated as follows, omitting as far as possible all technical terms:—

- (1) Men engaged in anilin black dyeing and the manufacture of nitrobenzene compounds are

necessarily exposed more or less to the danger of absorbing these bodies and so becoming poisoned.

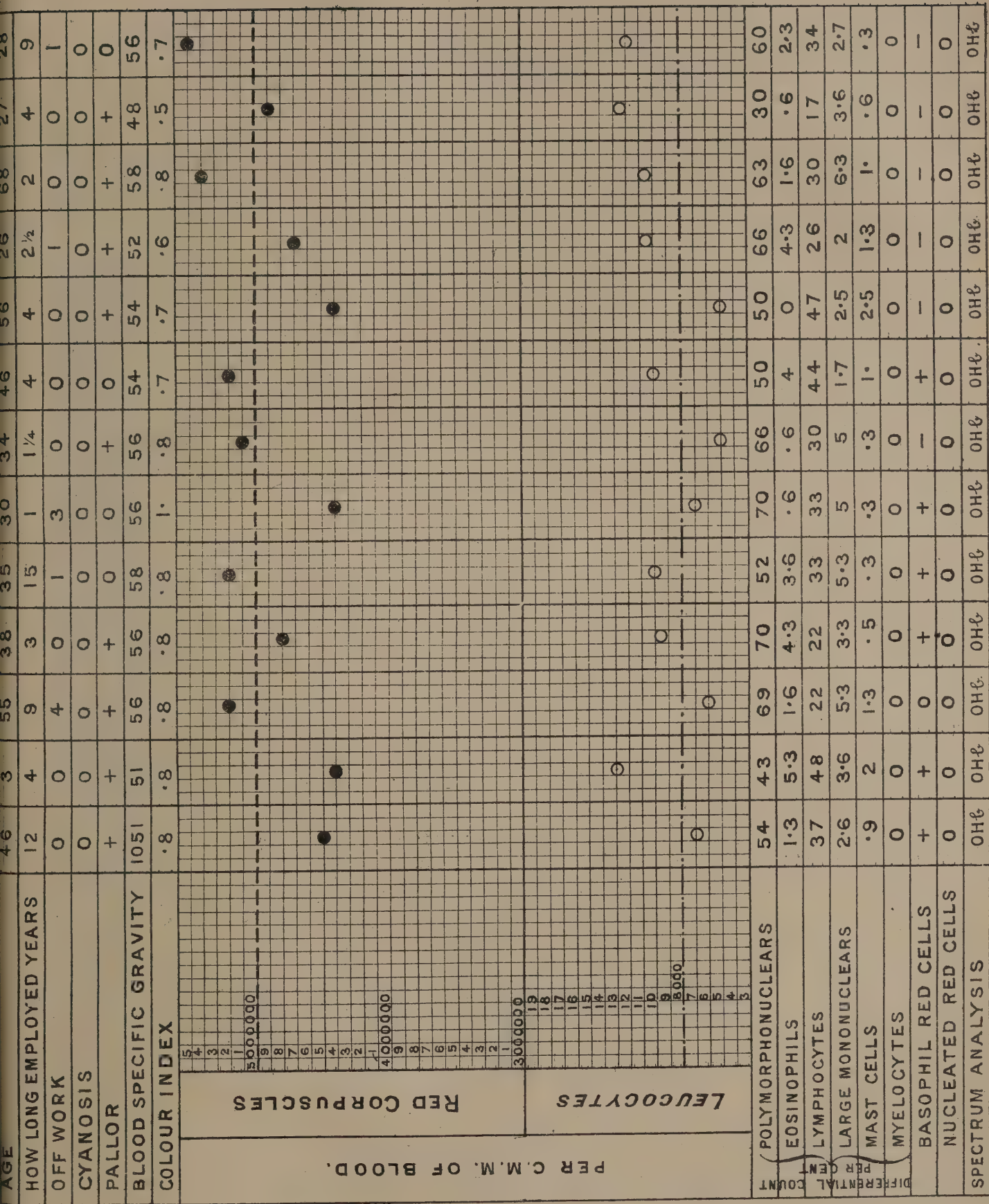
- (2) The danger of poisoning is much greater in the case of nitrobenzene manufacture than of anilin dyeing, and in both trades is greater in hot than in cold weather.
- (3) These compounds principally affect the blood, causing degeneration and destruction of the red corpuscles. If the amount of poison absorbed is considerable they may cause death by depriving the blood of its power to take in oxygen from the air.
- (4) When absorbed in smaller amounts they give rise to conditions which affect the health of the workers prejudicially.
- (5) By means of blood examination it is possible to detect cases of poisoning by these bodies in quite early stages.
- (6) When removed from contact with the poison the blood quickly regains its natural condition.

WALTER MALDEN, M.D.

From the Pathological Laboratories,
University of Cambridge.

March 8, 1907.

CHART I.
ANILIN DYERS.

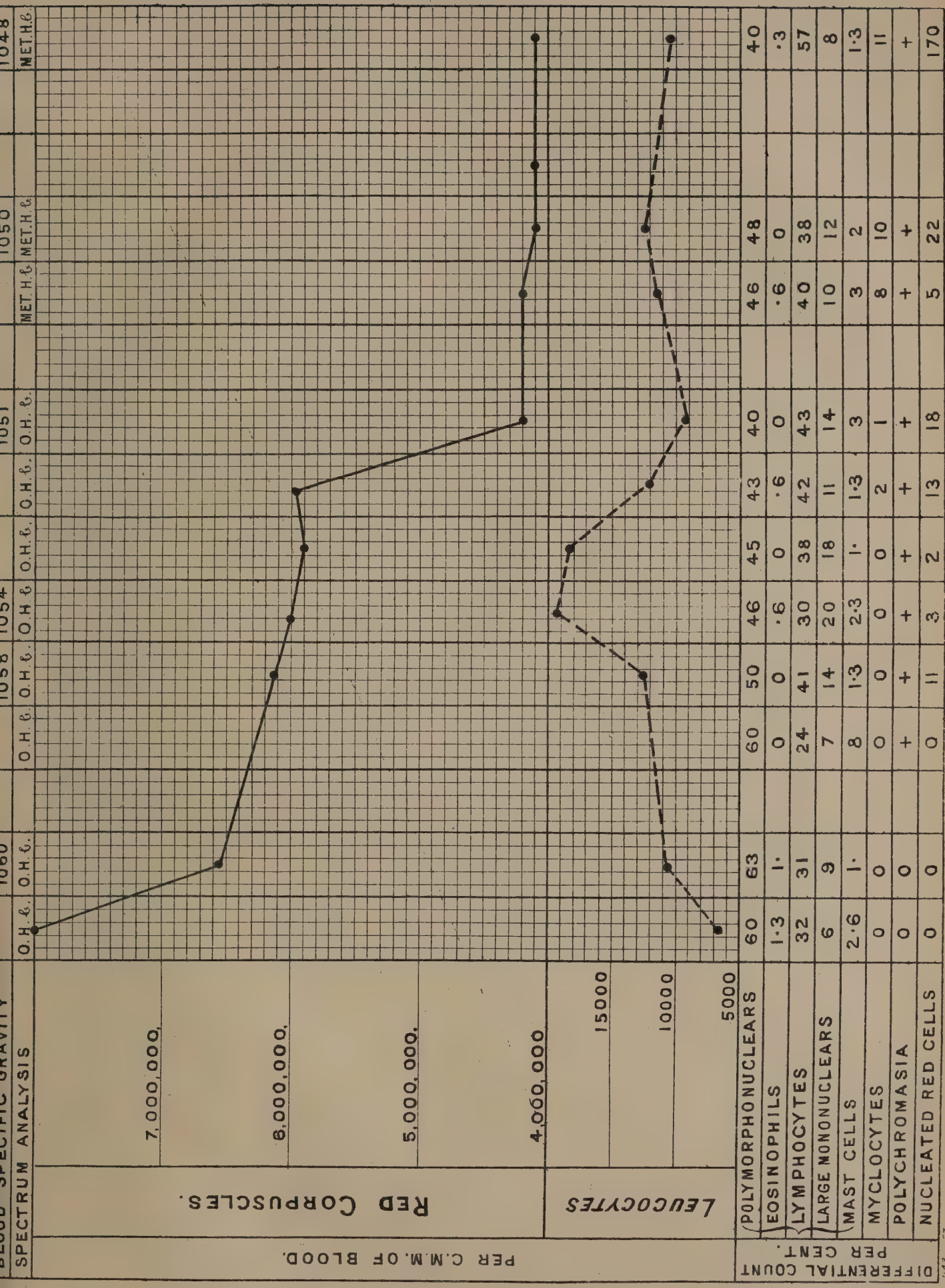


| AGE | 24 | 27 | 45 | 22 | 30 | 42 | 29 | 41 | 35 | 34 | 26 | 30 | 32 | 51 | 49 | 50 | 51 | 53 | 52 | 33 | 34 | 35 |
|------------------------|------|--------|------|--------|-------|--------|------|---------|---------|-------------|-----------|--------|----------|------|-------|-------|------|----------|----------|---------|---------|--------|
| | 3 M. | 1 WEEK | 1 M. | 1 WEEK | 1 DAY | 4 DAYS | 9 M. | 2 YEARS | 8 YEARS | 1 1/2 YEARS | 1.10 DAYS | 2 DAYS | 3 1/2 M. | 4 M. | 10 M. | 18 M. | 5 M. | 10 YEARS | 12 YEARS | 7 WEEKS | 3 WEEKS | 4 DAYS |
| HOW LONG EMPLOYED | 0 | 0 | 0 | 0 | 0 | 0 | + | 0 | 0 | + | + | + | + | + | + | + | 0 | 0 | + | + | 0 | 0 |
| OFF WORK | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| CYANOSIS | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| PALLOR | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| BLOOD SPECIFIC GRAVITY | 1052 | 1060 | 1054 | 1058 | 1060 | 1058 | 1056 | 1054 | 1057 | 1057 | 1057 | 1055 | 1055 | 1055 | 1054 | 1054 | 1055 | 1052 | 1052 | 1052 | 1052 | 1060 |
| COLOR INDEX | .8 | 1. | .9 | .9 | 1. | 1. | .8 | .9 | .9 | 1. | 1. | .9 | .8 | .8 | .8 | .9 | .9 | 1. | 1. | 1. | 1. | 1. |
| PER CMM. OF BLOOD | | | | | | | | | | | | | | | | | | | | | | |
| RED CORPUSCLES | | | | | | | | | | | | | | | | | | | | | | |
| LEUCOCYTES | | | | | | | | | | | | | | | | | | | | | | |
| POLY MORPHONUCLEARS | | | | | | | | | | | | | | | | | | | | | | |
| EOSINOPHILS | | | | | | | | | | | | | | | | | | | | | | |
| LYMPHOCYTES | | | | | | | | | | | | | | | | | | | | | | |
| LARGE MONONUCLEARS | | | | | | | | | | | | | | | | | | | | | | |
| MOST CELLS | | | | | | | | | | | | | | | | | | | | | | |
| MYELOCYTES | | | | | | | | | | | | | | | | | | | | | | |
| BASOPHIL RED CELLS | | | | | | | | | | | | | | | | | | | | | | |
| NUCLEATED RED CELLS | | | | | | | | | | | | | | | | | | | | | | |
| SPECTRUM ANALYSIS | | | | | | | | | | | | | | | | | | | | | | |
| 70 TO 72 | | | | | | | | | | | | | | | | | | | | | | |
| 2 TO 4 | | | | | | | | | | | | | | | | | | | | | | |
| 22 TO 25 | | | | | | | | | | | | | | | | | | | | | | |
| 2 TO 4 | | | | | | | | | | | | | | | | | | | | | | |
| .5 | | | | | | | | | | | | | | | | | | | | | | |

1060

1

70 TO 72
2 TO 4
22 TO 25
2 TO 4
.5



APPENDIX XXII.

TRANSLATION, by Dr. Legge, of Section on Glass Bottlemakers' Cataract by C. Hess, in Graefe-Saemisch's *Handbuch der Gesanten Augenheilkunde*. 2nd Edition, Part II., Chap. IX., pp. 106-108. Leipzig, 1905.

That long exposure to fire can affect the lens had already been pointed out by Plenk (1787) and Beer (1817). The latter was the first to refer to glass bottle-makers' cataract. Wenzel, jun., had pointed out in 1808 in a treatise on cataract that "persons often exposed to intense fire" are more liable to the disease than others. Later references to the frequency of cataract among glassblowers are given by Arlt, Hasner, Mackenzie, Panas, de Wecker, etc. Recent special references to the subject are those of Meyhöfer (1886), Röhlinger (1888), Landolt (1894), and Hirschberg (1898).

Meyhöfer found 9.5 per cent. of glassmakers under 40 years of age cataractous, and 26.5 per cent. in those over 40. Röhlinger found among 287 glassmakers 7.66 per cent. affected (mostly with the ray form, or with lumpy opacities); under 40 years of age 3.35 per cent. were affected, and 19.23 per cent. in those over 40. Of these glassmakers, bottleblowers showed the highest proportion—31.25 per cent. in workers over 40 years, and 7.69 per cent. in those under 40. This proportion is relatively very high, remembering that the number of those suffering from cataract in the general population among 10,000 persons over 50 years is 0.056 per cent. (Kerschbaumer), and 0.124 per cent. among 10,000 persons over 60 years (Magnus). Gerock (1903) finds in his statistical investigations as to occupation and cataract, that no calling shows special inclination to the disease except, perhaps, that in which there is exposure to dazzling light. The cataract of glassblowers, according to Röhlinger, is of specially slow growth. What is its cause it is difficult to say. The marked loss of water by perspiration can hardly come into account. At any rate, we do not find opacity of the lens with the same frequency in other occupations where perspiration is very great. The glassblowers are often subjected at their work to a temperature of 50-55 C., but among iron workers, exposed to similar temperatures, cataract is not specially frequent. Robinson (1903) finds that among glassblowers generally only the finisher becomes cataractous, as his eyes, in fashioning the neck of the bottle, are much exposed to the glow—as much as six to seven hours per week. It commences, he finds, about the fiftieth year, and usually at the posterior pole.

Leber (1903) believes the origin of glassblowers' cataract is attributable mainly to concentration of the aqueous humour. He says: "Through the constant heat the evaporation from the corneal surface must be considerably increased, and, with a further great loss of water by sweating, concentration of aqueous humour

can be so increased as thereby to cause opacity of the lens. This view receives support from Ewald's observation—namely, that by evaporation after death the aqueous humour can within one day become so concentrated as to produce opacity of the lens. This dulling by loss of water in the living eye passes away spontaneously; constant repetition of the same damage might produce permanent effects."

Against this view are the following points:—The form of cataract which arises from increase in the concentration of aqueous humour, as in Ewald's instance, cited by Leber, occurs, if not exclusively, always at first in the region of the pupil, where the concentration of the aqueous humour can act on the lens. Further, we know that "salt" cataract, induced by increase of the concentration of the aqueous humour (for example, by introduction of salt into the conjunctival sac)—that is, in cases where there is relatively strong increase of concentration of the aqueous humour, the opacity of the lens "appears always to be limited to that part of the anterior pole of the lens which borders on the pupil" (Heubel). Even after injection of a 10 per cent. solution of sodium chloride into the anterior chamber only the free-lying portion of the lens in the region of the pupil is affected. Therefore, it must be supposed that glassblowers' cataract, if the above view is accurate, would be directly visible in the pupillar region. Of this, however, nothing is known. On the contrary, as is clear from the above references, the cataract is often found at the posterior pole, or at the posterior border, *i.e.*, at places in the lens which are affected in a far less degree by marked change in concentration of the aqueous humour than the anterior polar region of the lens lying free in the pupillar area. Besides, we should not forget that both the cataract of Ewald, as also the other opacities caused by increasing the concentration, show a distinctly different character from that of the glass-blowers' cataract in question, inasmuch as the former have never yet been observed to be progressive or to have shown the clinical appearances noted in glass-blowers' cataract. Whether the oft-repeated effect of concentration of aqueous humour can act in quite a different way from what we know it does in the few instances noted, and whether it is temporary, as the latter is, or can effect lasting influence on the transparency of the lens, we have no knowledge. Peters (1904) considers it probable that glass-blowers' cataract "is connected with the congestion produced in the act of blowing," and inclines, therefore, to the view that it is akin to the cataract form produced by ligature of the vertebral veins.

APPENDIX XXIII.

(Additional figures supplied by Mr. Greenwood, Secretary of the Glass Bottle Makers of Yorkshire Trade Protection Society.)

I.—NATIONAL GLASS BOTTLE MAKERS' SOCIETIES, DECEMBER 1906.

TABLE showing the Proportion of Men and Apprentices belonging to each Stage of the Trade, including those Employed and Unemployed only —

| Districts. | Bottle Makers (Finishers). | Blowers. | Gatherers and Blowers.* | Gatherers. | Totals. |
|--------------------------|-------------------------------|----------|----------------------------|------------|---------|
| Yorkshire - - - - - | 713 | 710 | 57 | 684 | 2,164 |
| Lancashire - - - - - | 294 | 256 | 96 | 257 | 903 |
| Sunderland - - - - - | 73 | 77 | — | 79 | 229 |
| Seaham Harbour - - - - - | 59 | 61 | 1 | 59 | 180 |
| Bristol - - - - - | 25 | 22 | 4 | 22 | 73 |
| Portobello - - - - - | 71 | 67 | 8 | 68 | 214 |
| Glasgow - - - - - | 65 | 62 | 18 | 60 | 205 |
| Alloa - - - - - | 16 | 17 | 3 | 16 | 52 |
| Dublin - - - - - | 57 | 53 | 14 | 61 | 185 |
| Totals - - - - - | 1,373 | 1,325 | 201 | 1,306 | 4,205 |

* "Gatherers and blowers" means that they fill both stages. They gather the molten glass and then blow it into a bottle. A gatherer simply gathers and then hands it to the blower, each filling a separate stage. The maker finishes the mouth or lip of the bottle.

NOTE.—This Table does not include the men who are following callings out of the trade who have withdrawn from it through want of employment, etc., nor superannuated members.

II.—GLASS BOTTLE MAKERS' SOCIETY, YORKSHIRE.

TABLE Showing the Proportion of Men and Apprentices belonging to each Stage of the Trade, December 1906, including those Employed and Unemployed only.

| Branch. | Bottle Makers (Finishers). | Blowers. | Gatherers and Blowers.* | Gatherers. | Totals. |
|--------------------------|-------------------------------|----------|----------------------------|------------|---------|
| Castleford - - - - - | 103 | 103 | 6 | 97 | 309 |
| Swinton - - - - - | 80 | 80 | 6 | 91 | 257 |
| Hunslet - - - - - | 61 | 69 | 2 | 58 | 190 |
| Thornhill Lees - - - - - | 70 | 71 | 9 | 75 | 225 |
| Knottingley - - - - - | 64 | 62 | 3 | 74 | 203 |
| Wakefield - - - - - | 32 | 32 | — | 32 | 96 |
| Barnsley - - - - - | 111 | 105 | 14 | 94 | 324 |
| Conisbro' - - - - - | 39 | 41 | 4 | 40 | 124 |
| Masbro' - - - - - | 5 | 4 | — | 4 | 13 |
| Wombwell - - - - - | 15 | 16 | — | 12 | 43 |
| Blaydon - - - - - | 29 | 24 | 5 | 16 | 74 |
| Newport - - - - - | 28 | 28 | 7 | 25 | 88 |
| London - - - - - | 10 | 10 | 1 | 8 | 29 |
| Stairfoot - - - - - | 66 | 65 | — | 58 | 189 |
| Totals - - - - - | 713 | 710 | 57 | 684 | 2,164 |

* "Gatherers and blowers" means that they fill both stages. They gather the molten glass and then blow it into a bottle. A gatherer simply gathers and then hands it to the blower, each filling a separate stage. The maker finishes the mouth or lip of the bottle.

[NOTE.—This Table does not include the men who are following callings out of the trade who have withdrawn from it through want of employment, etc., nor superannuated members.]

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1. The first of these is the fact that the
2. of the system is not a simple one, but
3. a complex one, involving many factors.
4. The second is the fact that the system is
5. not a simple one, but a complex one, involving
6. many factors. The third is the fact that the
7. system is not a simple one, but a complex one,
8. involving many factors. The fourth is the fact
9. that the system is not a simple one, but a
10. complex one, involving many factors.

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DIXON, W. E., M.D., Professor at Cambridge and King's College. Evidence 5692-727.

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Intemperance prevalent, *Hall* 3641, 3695, 3699, 3703-4 ; *Orbell* 3799.

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DREYFUS, SYLVAIN, Deputy Manager of Clayton Aniline Works, Manchester.

- Evidence, 6629-82.
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DUNN, L. A., M.S., F.R.C.S., Guy's Hospital, Surgeon to National Truss Society.

- Evidence, 7175-7233.
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EATOCK, J. A., M.R.C.S., L.R.C.P., of Widnes.

- Evidence, 3945-78.

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ELLIS, THOMAS RATCLIFFE, Secretary to the Mining Association of Great Britain.

- Evidence, 9270-90.
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ELSWORTH, R. C., M.D., F.R.C.S., of Swansea.

- Evidence, 8275-314.
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- Evidence by A. Mechan, on behalf of, 5090-5172.
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EVERED, Mr., of Messrs. Evered & Co., Ltd., Smethwick.

- Evidence, 2418-68.
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EVANS, E. B., L.R.C.P., M.R.C.S., Surgeon to the Atlantic and Pacific Works.

- Evidence, 7765-835.

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- Evidence by J. G. Ashmore on behalf of, 9755-820.

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- See* Phthisis, Fibroid.

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FITZMAURICE, Mr., C.M.G., Chief Engineer to the London County Council.

- Evidence, 10440-65.

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FOTHERINGHAM, JOHN, M.B., C.M., L.F.P.S., of Motherwell, Glasgow. Evidence, 5474-5548.

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FRISWELL, J. R., Past Vice-President of the Institute of Chemistry; Past Member of the Council of the Chemical Society; Chairman of the Society of Chemical Industry (London Section). Evidence, 3733-58.

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GAVIN, JAMES, Secretary to Amalgamated Society of Steel and Iron Workers. Evidence, 5173-5257.

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GIBSON, R. J. HARVEY, M.A., Professor of Botany at the University of Liverpool. Evidence, 6467-503.

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GLAISTER, PROFESSOR JOHN, M.D., Doctor of Medicine of the University of Glasgow, &c. Evidence, 4364-548.

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GLASS BOTTLE MAKERS OF YORKSHIRE UNITED TRADE PROTECTION SOCIETY. Evidence of secretary, A. Greenwood, 8791-852.

- Table showing glass bottle hands in the society incapacitated during 1891-7, *Greenwood* 8826.

GLASS BOTTLE MANUFACTURERS' ASSOCIATION OF LANCASHIRE. Evidence of Secretary, C. B. F. Borron, 10805-20.**GLASS BOTTLE MANUFACTURERS' ASSOCIATION OF YORKSHIRE.** Evidence of the Chairman, W. Breffitt, 10782-804.**GLASS MAKERS' SOCIETIES OF THE UNITED KINGDOM.** Evidence of Secretary, A. Greenwood, 8791-8852.**"Glenny Blink"**

- See* Miners' Nystagmus.

GRAHAM, H. E., M.A., M.B., of Canterbury.

- Article on satinwood in the "British Medical Journal" of 15th April, 1905, *cit. Jones*, 9893.

Grain Porters

- See under* Dock Labourers' Diseases.

GREENE, ARNOLD J., M.R.C.S., L.R.C.P., of Wigan Infirmary, &c. Evidence on behalf of Mining Association of Great Britain, 9225-69.

- Beat knee, hand and elbow, 9241-6, 9263-9.
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GREENWOOD, ALFRED, Secretary of Glass Bottle Makers of Yorkshire United Trade Protection Society, &c. Evidence, 8791-8852.

- Bottle-makers' cataract, 8791-852.

GREGOR, Mr., Managing Director of the Graigola Fuel Works, Swansea. Evidence, 8232-74.

- Pitch poisoning, 8232-74.

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- Comparison of death rates of grinders and cutlers in Sheffield, *Scurfield* 1865.
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- Proportion of men affected, *Scurfield* 1881.
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HALDANE, J. S., M.D., F.R.S., Member of the Departmental Committee on Ventilation of Railways. Evidence, 2910-3197.

- Carbon monoxide poisoning, 2910-73.
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HALL, ARTHUR, M.A., M.D., F.R.C.P., Physician to the Sheffield Royal Hospital, &c. Evidence, 1664-825.

- Cutlers' respiratory diseases, 1702, 1790-1801.
- Dust, different kinds of, 1666-95.
- Eczema in silver-plating trades, 1819-25.
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HALL, GEORGE ROME, M.D. Evidence for the Dock Labourers' Union, 3628-3732.

- Dock labourers' diseases, 3632-732.

HALL, ROBERT, L.R.C.P., L.R.C.S., Medical Officer of Belfast Infirmary. Evidence, 7366-423.

- Flax trade: bronchitis and phthisis, 7370-423.

HANCOCK, WILLIAM, Secretary of the Operative Masons' Society in London. Evidence, 10272-393.

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HARTILL, J. T., L.R.C.P., M.R.C.S., of Willenhall, Wolverhampton. Evidence, 7547-603.

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HARVEY, W. E., M.P., Secretary of Derbyshire Miners' Union. Evidence, 9545-9625.

- Beat hand and knee, 9587-8.
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HAYHURST, JOSEPH, Secretary of the Operative Dyers' Society. Evidence, 349-489.

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HEDLEY, JOHN, M.D., Doctor and Past Mayor of Middlesbrough. Evidence, 2784-2833.

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HILLMAN, G. B., L.S.A., in practice at Castleford, Yorkshire. Evidence, 11000-69.

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HINCHLIFFE, HERBERT, Proprietor of Ganister Mines. Evidence, 8684-732.

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HOLMSHAW, Mr., Secretary of the Sheffield United Cutlery Council. Evidence, 10848-958.

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HOUSE, ALDERMAN. Evidence on behalf of the Durham Miners' Association, 10078-119.

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JONES, J. ARNALLT, M.D., of Aberavon. Evidence, 7919-85.

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JONES, HUGH E., L.R.C.P., M.R.C.S., Ophthalmic Surgeon, St. Helens Hospital. Evidence, 5877-904.

Bottle-makers' cataract, 5879 904.

JONES, H. E., M.B., C.M., of Glasgow. Evidence, 9887-930.

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JONES, J., M.D., Medical Officer to employees of the Brunner Mond Company, Clydach. Evidence, 3380-421.

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KELLOW, M., General Manager and Secretary of the Park and Croesor Slate Quarry in North Wales, &c. Evidence, 5821-56.

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KILNER, CALEB, bottle manufacturer at Thornhill, and Conisburgh. Evidence, 9857-86.

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KITE, EDWIN, W. D., M.B., M.R.C.S., L.S.A., Medical Officer, Wortley, near Sheffield. Evidence, 8768-90.

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KNIGHT, ALEXANDER J., for Amalgamated Society of Railway Servants. Evidence, 5960-6006.

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LOAKE, JOHN, of Loake Bros., Kettering, Vice-
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Longbotham, JONATHAN, director and con-
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Royal Veterinary College, President of the Royal
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McALDOWIE, A.M., M.D., of the North Staffordshire
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Provident Institution. Evidence, 6832-6917.

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McCULLY, A. L., M.B., doctor to employees of Messrs.
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McSTOCKER, W. C., President of the Society of
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MALET, HENRY, M.D., Medical Officer of Health for
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9552, 9606-24.

Prevalence of, *Smillie* 9480; *Harvey* 9615-18.

Prevention by baths, &c., *Smillie* 9497-504.

Miners' Bronchitis

Caused by dust, *Glaister* 4483; *Bell* 4961, 4964-5

Tatham 9339-40; *Harvey* 9602.

Distinguishability from ordinary bronchitis, *Bell*
4957-60, 4963-4.

Prevalent, *Harvey* 9618; *Tatham* 9344.

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See Beat Elbow.

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Miners' Nystagmus

Burden of proof should rest on employer, *Ellis*
9288.

Cases, *Meighan* 3071-2; *Boyle* 5772-81; *Anderson*
5844, 5864; *Murray* 9025, 9037; *Smith* 9170;
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In industries other than mining, *Snell* 1626-7,
1629; *Shufflebotham* 2184, 2205-6.

Recognised by benefit societies, *Bell* 4944-6.

Seldom severe, *Meighan* 5046.

Caused by insufficient light, *Boyle* 5778-9; *Anderson*
5846, 5866; *Murray* 9034; *Smillie* 9445;
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Caused by strained position of head and eyes, *Snell* 1473-85; *Preston* 1542-9; *Snell* 1626, 1629; *Shufflebotham* 2132-3, 2167; *Murray* 9034; *Smillie* 9445; *Leigh* 10047; *Wilson* 10088.

Compensation advisable, *Moody* 8470; *Smillie* 9445, 9465-9; *Harvey* 9549; *Wilson* 10086.

Difficult to administer, *Meighan* 5047-53, 5086-9; *Greene* 9235; *Ellis* 9276.

Might be claimed by many, *Snell* 1603, 1611-5; *Shufflebotham* 2171; *Meighan* 5047, 5054; *Smith* 9203-7.

Necessary when severe, *Bell* 4947-56; *Meighan*, 5041-5.

Should be shared by all employers, *Ellis* 9276-8.

Conditions of work, *Snell* 1473, 1475-6, 1479-80; *Preston* 1496, 1499-1503, 1506-9.

Degree of Nystagmus, and incapacity do not advance *pari passu*, *Snell* 1579-81, 1616-17; *Shufflebotham* 2120, 2163-6; *Bell* 5013-4; *Murray*, 9038-44; *Smith* 9187-90; *Leigh* 10050-1; *Wilson* 10088-90.

Description of, *Anderson* 5855.

Diagnosis fairly easy, *Moody* 8460-2; *Murray* 9028; *Smith* 9173-4.

First stage may be ignored, *Meighan* 5078-9.

Gradual development, *Shufflebotham* 2136-7; *Murray* 9064-5; *Nasmyth* 9136; *Smith* 9184; *Greene* 9236-7; *Smillie* 9464; *Wilson* 10084.

Incapacitation from disease rare, *Shufflebotham* 2113-4, 2135; *Nasmyth* 9133-4.

Malingering: Whether possible, *Shufflebotham* 2111-2; *Meighan* 5039; *Moody* 8475, 8479; *Murray* 9044, 9059, 9064; *Smith* 9181-5; *Smillie* 9451-8; *Wilson* 10085.

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Oscillations frequent, *Snell* 1483, 1579, 1599.

Possibility of a chronic oscillatory stage not interfering with work, *Snell* 1598-1602, 1638.

Prevention, whether possible, *Snell* 1603-10.

Proclivity to disease incurable, *Meighan* 5032, 5055-8, 5080-1, 5084.

Proportion of colliers affected, *Snell* 1604; *Shufflebotham* 2114-6; *Bell* 4941-2; *Meighan* 5025, 5064; *Harvey* 9561.

Rest or change of occupation necessary for cure, *Snell* 1588-96; *Meighan* 5031, 5061; *Murray* 9052-5, 9062; *Greene* 9237-40; *Smillie* 9447-8, 9549-63; *Leigh* 10048.

Safety lamps conducive to it, *Snell* 1643; *Meighan* 5069-70; *Browne* 5431-4; *Robertson* 5461-72; *Boyle* 5778-9; *Anderson* 5846; *MacPhail* 5609; *Harvey* 9566-86.

Scheduling: Consequences likely to occur, *Snell* 1612, 1621-5; *Ellis* 9276-81.

Suspension recommended, *Murray* 9054-63; *Smith* 9176.

Symptoms, *Snell* 1476, 1484-5; *Preston* 1486-9, 1512-6, 1528-39, 1549-55, 1562-4; *Bell* 4940, 4946; *Meighan* 5033, 5072-5; *Murray* 9043, 9047-50, 9056; *Smith* 9180.

Time lost through illness, *Preston* 1516, 1552-5; *Bell* 4942-3; *Meighan* 5024-7, 5034.

Miners' Phthisis

Anthraxosis, a better term, *Moody* 8547; *Reynolds* 6325, 6332.

Cases decreasing, *Scott* 4553-4; *MacPhail* 5561-3; *Brooke* 8646-9; *Nasmyth* 9117-9; *Smith* 9153; *Tatham*, 9310-11, 9330, 9344; *Oliver* 10636.

Increasing, *Moody*, 8530-1.

Coal dust the cause, *O'Keefe* 6030, 6096-101; *Reynolds* 6350-5; *Hartill* 7573, 7578-9; *Moody* 8517-21, 8524, 8554-7.

Not the cause, *Haldane* 3144; *Murray* 9081; *Nasmyth* 9117; *Smith* 9157; *Oliver* 10644, 10674.

Coal or ganister the cause? *Kite* 8779; *Brooke* 8697-8639.

Change of occupation beneficial, *Moody* 8527.

Compensation advisable, *O'Keefe* 6077-8; *Moody* 8529.

Difficulties of, *Oliver* 10704.

Difficulty of fixing responsibility, *Haldane* 3111, 3136.

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Compensation advisable.—*cont.*

For incapacitation from fibrosis only, *Hartill* 7598.

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Death not actually caused, *O'Keefe* 6103.

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In Willenhall, *Hartill* 7602.

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Easy, *O'Keefe* 6027; *Smith* 9164.

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Symptoms, *Haldane* 3183-6; *Muir* 4754-7; *O'Keefe* 6027, 6047-64, 6068, 6083, 6103; *Hartill* 7572, 7580-5; *Oliver* 10653.

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MOORE, BERNARD, Stoke-on-Trent. Evidence, 6954-78.

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MOORE, DENIS, glass bottle manufacturer at Woolwich. Evidence, 10195-214.

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MORROW, L., member of Amalgamated Society of Lithographic Artists, &c. Evidence, 8943-9020

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MUIR, ROBERT, M.D., Professor of Pathology in Glasgow University. Evidence, 4736-810.

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MURRAY, GEORGE, M.A., M.D., F.R.C.P., physician to North of England United Coal Trade Association, &c. Evidence, 9021-9104.

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MURRAY, H. MONTAGUE, M.D., senior physician at Charing Cross Hospital. Evidence, 4076-4104.

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MURRAY, WILLIAM, M.D., formerly of Birmingham General Dispensary. Evidence, 2207-2348.

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NASMYTH, T. GOODALL, M.D., D.Sc., D.P.H., F.R.S.E., Medical Officer for Fife, Kinross, and Clackmannan-shires. Evidence on behalf of Mining Association of Great Britain, 9105-39.

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Nitrous Fumes, Poisoning from

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NORGATE, R. H., M.R.C.S., L.R.C.P., Medical Officer of Stapleton Workhouse, Bristol. Evidence, 10215-71.

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O'KEEFE, P. J., L.R.C.P., L.R.C.S., doctor to Chemical, and Miners' Societies, St. Helens. Evidence 6007-131.

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"Luftdruck Erkraubungen," *cit. Hill* 809, 814, 860.

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WYPER, WILLIAM, M.B., CH.B., of Motherwell, Medical Officer to Dalzell Poorhouse. Evidence, 5258-413.

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Western Union
Telegraph Company
New York, N.Y.
October 10, 1901

Mr. J. P. Morgan
1 Wall Street
New York, N.Y.

Dear Sir:

I have the honor to acknowledge the receipt of your letter of the 9th inst.

in relation to the proposed purchase of the Western Union Telegraph Company.

The Board of Directors of the Western Union Telegraph Company has considered your offer and has decided to decline the same.

I am, Sir, very respectfully,
Yours very truly,
J. P. Morgan

TO THE
WESTERN UNION
TELEGRAPH COMPANY
NEW YORK, N.Y.

FROM
J. P. MORGAN
1 WALL STREET
NEW YORK, N.Y.

RE
YOUR LETTER OF THE 9TH INST.

IN RELATION TO THE
PROPOSED PURCHASE
OF THE WESTERN UNION
TELEGRAPH COMPANY

THE BOARD OF DIRECTORS
OF THE WESTERN UNION
TELEGRAPH COMPANY
HAS DECIDED TO
DECLINE THE SAME

I AM, SIR, VERY RESPECTFULLY,
YOURS VERY TRULY,
J. P. MORGAN

